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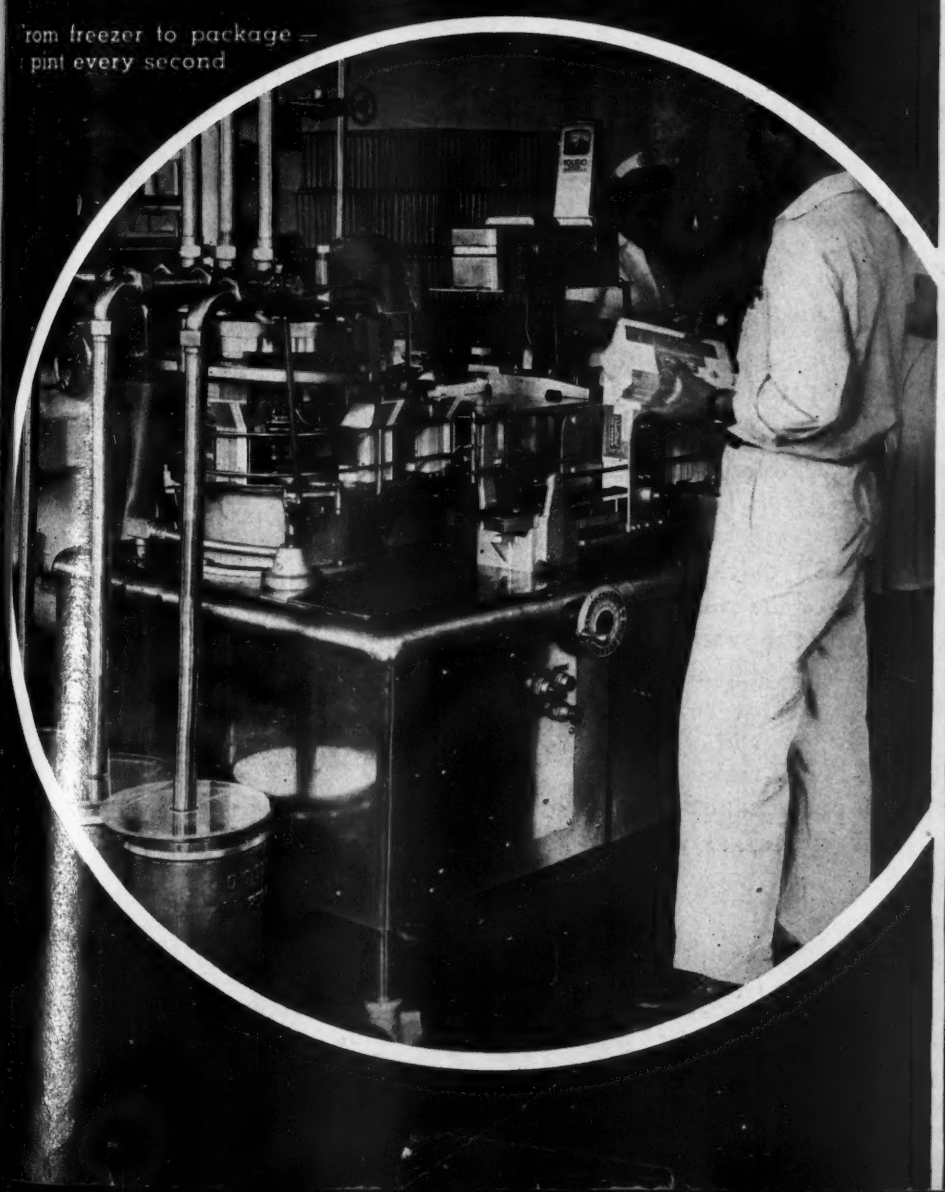
FOOD INDUSTRIES

NATIONAL EDITION

● FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION



NOVEMBER 1947

Bottler's Sanitary Control System

Rycena—Wheat In Eastern Dress

Proper Wrapping Of Frozen Meats

Gear Motors For Dough Mixers

Improved Quality Separator for Peas

Sugar in Bulk Aids Big Users

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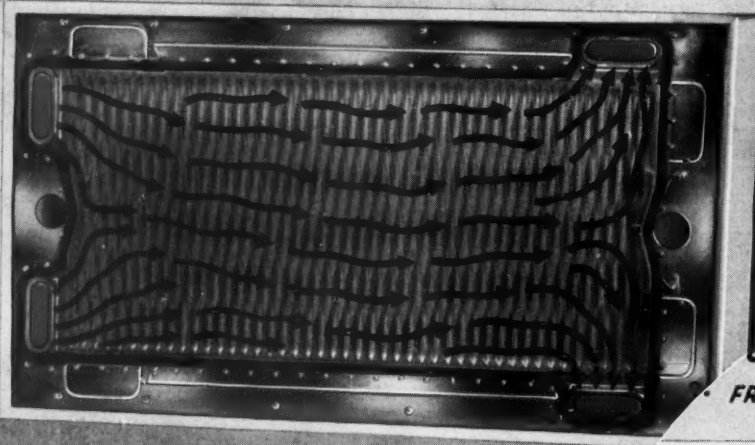

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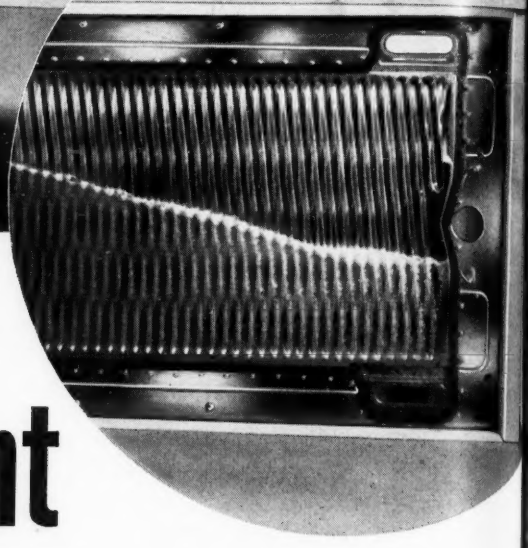

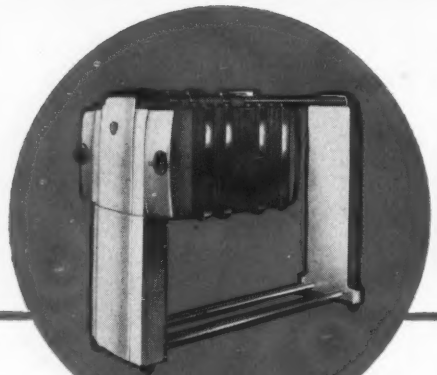

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FOOD INDUSTRIES

FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

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THE COVER

PURE-PAK ice cream packaging machine, at plant of Detroit Creamery Co., picks flat pint carton from magazine; forms, closes and locks bottom flaps; fills it with cream from continuous freezers, then discharges carton through unit which closes and locks top flaps.

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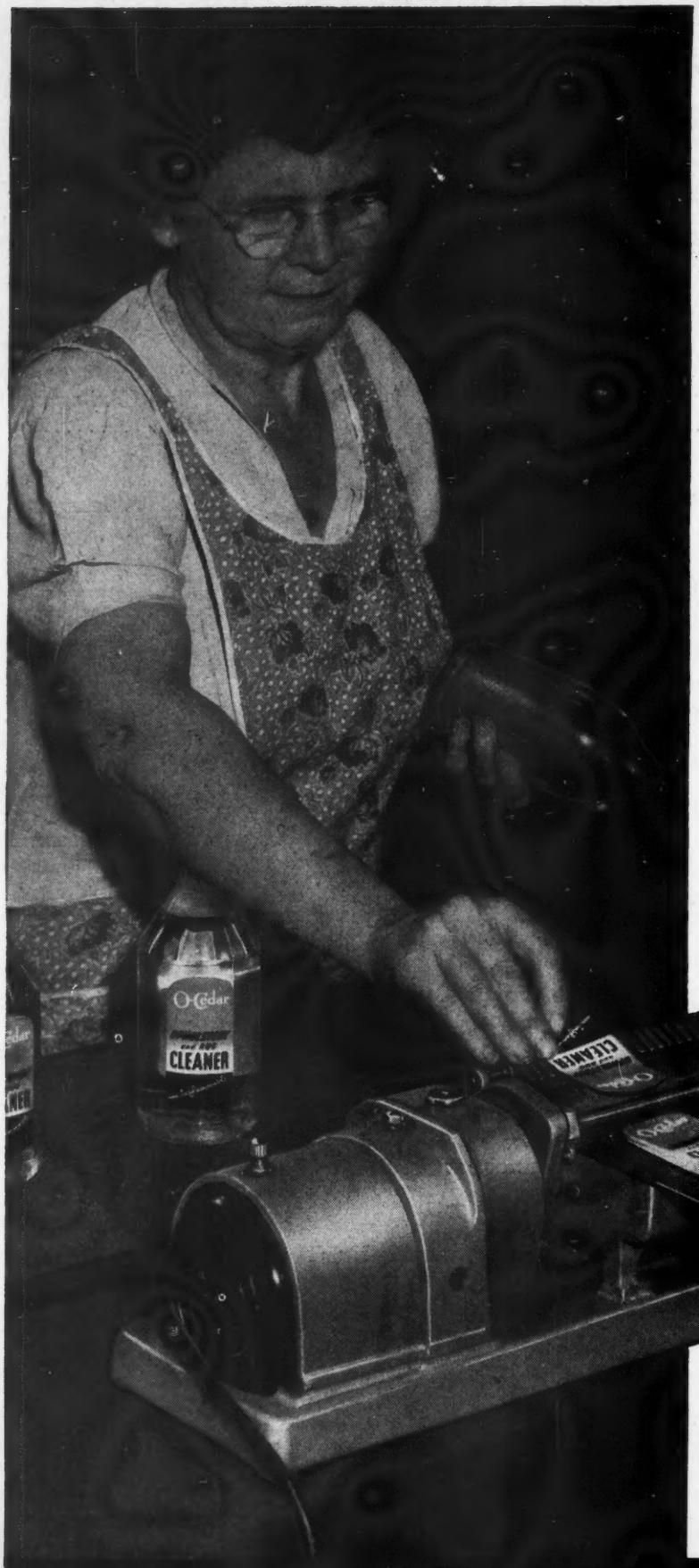

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Effects of the Marshall Plan

WHEN, as and if the Marshall plan is implemented by Congress, there are bound to be many effects on the economy of the nation in general and on the various branches of the food processing industry in particular.

There was a time when bullets seemed cheaper than food. But any informed American now realizes that war is far more costly than food. While granting aid to Europe cannot guarantee that we shall be able to forestall the assent by hopeless millions to further encroachment by Moscow, such aid as we can give offers the only way of restoring their hope and sanity.

The problem is to make it possible for European nations to select an economy and form of government based on the choice of healthy minds rather than as a means of merely staying alive. Unfortunately, however, America is not the land of limitless plenty as so many erroneously believe. Yet we are committed to supply enormous quantities of foods. Once undertaken, the task must be carried out!

The foreseeable end will not come until 1951 at the earliest, and the cost to the United States has been estimated by the Paris Conference on the Marshall Plan to be $15,810,000,000. For the rest of the Americas, the cost will probably be $5,790,000,000 more. When pondering the cost, compare it to the $300 billion cost of World War II. If a Third World War can be avoided by spending $16 billions in the next four years the monetary saving alone will be notable.

Huge Export Demand

The world food export demand will continue to be huge, but it is expected to taper off. Table 7 of Section 131 of the Paris Report (reproduced below) shows what it is calculated to be, not in terms of need, but in terms of what is likely to be available, about three-fourths of which will come from the U.S.A.

Import Requirements of Food and Feeding Stuffs From Non-participating Countries

(Millions of Tons)

	'34-'38	'46-'47	'47-'48	'50-'55
Bread Grains	14.0	15.3	23.7	17.9
Coarse Grains	11.4	4.7	8.6	11.7
Sugar	2.7	1.7	1.7	2.3
Meat	1.7	1.6	2.1	2.5
Fat (Oil equivalent)	2.7	1.1	1.7	2.3
Oil Cake (Inc. oil cake content of imported oil seeds)	5.0	1.9	3.5	5.4

From the preceding table it is possible to visualize some of the food processor's problems in the next four years:

Cereals for domestic processing will be high priced, but cereal foods and baked goods will still be an economical source of food for the consumer.

Grains for animal and poultry feeding will also be in great demand, and price declines will be small though trending downward, barring further crop failures. This will mean high priced meats, poultry and eggs; also high or higher priced dairy products.

Sugar will not be in larger demand but prices will remain at present high figures.

Meats will be scarce and high priced. Volume cannot catch up with demand because of feed scarcities.

Fats will be scarce and at continued high prices.

Predictable Trends and Opportunities

With or without voluntary food rationing the American people will need to turn to processed and raw fruits and vegetables in a bigger way. The economic forces will be in that direction.

There will also be a splendid 4-year opportunity for launching new high protein human foods of vegetable origin such as those made from soybeans, brewers yeast and the like—provided research has made them ready.

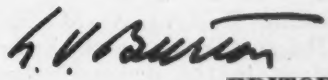
With the scarcity of steel and tin for can making we can look for increased emphasis on methods of preserving perishable foods that, like freezing, require less steel per ton of food saved. Similarly the glass container will be in greater demand.

The next four years should be a hey-day for locker plants and refrigerated warehouses.

In short, processors of the staple food items must plan for prolonged competition of Europe for their raw materials: The processors of luxury items will probably experience a relatively easier supply condition.

Effect on Business

You can translate the general export demand into terms of your own business as soon as Congress decides our national policy. What you can look for is more of the present situation rather than a correction and return to a "normal" condition. Weather will be the imponderable factor, to be sure. But, according to the Paris Report, there will be a diminishing need to export every available ton of food as fast as Europe recovers industrially and agriculturally.



EDITOR

The Talk of the Industry

● PRESIDENT Truman managed to put five food processors on the special citizens committee of 26 to conserve food and to advise him on how to feed Europe, along with bankers, publishers, labor leaders, one dean of agriculture, four heads of farm organizations, manufacturers, film magnates and trade and consumer organizations. Charles Luckman, recently moved up from head of Pepsodent to head of Lever Brothers Co., heads the committee. Let us hope his name is really prophetic.

● H. J. HEINZ COMPANY is now pushing the sale of its condensed tomato soup. Buy three cans of this soup and you get a free can of another variety. Looks as if Heinz had adopted the trick of making tomatoes do double duty.

● IF every American would eat one less slice of bread a day, it would save 70,000,000 bu. of wheat in a year, said President Truman in announcing his special Citizens Committee on Food Conservation in September.

How times change! It was not many years ago that the American Bakers Association was seeking someone who would persuade the public to eat one more slice a day. At that time, with bread on the table three times a day, we said the consumption could be increased only by making the bread taste better. Today we say the consumption can be decreased by robbing the formula and making it taste worse.

● ALL the past public utterances about curbing speculation in commodities are more or less eyewash for the benefit of the uninformed public. Naturally the public does not enjoy the high cost of living but speculation for the rise is more of an effect than a cause.

Speculation in a profitable sense (for the speculator) is possible only when the conditions are favorable to the speculator's plan. He cannot make the trends; he merely rides the trend.

So unbiased an observer as Dr. E. A. Goldenweiser, former head of the research department of the Federal Reserve Board has said "The speculator merely brings the future to the present." And the late Justice Holmes of the Supreme Court of the United States made the following statement in 1905: "Speculation . . . is the self adjustment of society to the probable. . . ."

The successful speculator often arouses envy and hate because he is smarter than the rest of us, but seldom does he arouse sympathy when he guesses wrong.

All business is a form of speculation. Business men buy goods in the expectation of selling at a profit above the original cost of the goods and the cost of the service rendered. That they do not always guess correctly is amply testified by the clearance sales so dear to the heart of every housewife who always seeks a bargain. The reason these sales are seldom correctly appraised is that only on commodity exchanges are the actual changes in prices accurately reported so that all may see and know.

Preventing speculation in commodities will only postpone the price changes that will normally occur in accordance with demand and supply. Prohibition of speculation will not prevent the price changes any more than anti-liquor laws stopped the consumption of alcoholic beverages in the Prohibition Era.

● WAXY maize seems to have lost its place as a substitute for cassava (flour) from Java. General Foods Corp. is now using cassava from Brazil for Minute Tapioca and is discontinuing Minute Dessert made from waxy maize. Unless Java gets busy soon and produces cassava in quantity, it will lose the American market to the higher priced Brazilian product.

● WE see by the ads that Cudahy Packing Co. has hired the enraptured advertising copywriter to create "Activated Seismotite" — the new ingredient in Old Dutch Cleanser.

Hors d'Oeuvres

● *The cranberry crop is only a little below last year's huge crop and turkeys will be ample. So, for only a slight additional mortgage on the house and furniture, it should be a bright Thanksgiving.*

● A new line of canned meats for babies is reported as soon to be placed in test markets. It is said they will bear the Gerber label, but carry the Armour Star trade mark. There will be no use trying to explain Florida and California citrus to the consumers, until you get this one straightened out.

● *The queen bee's long life is credited to the pantothenic acid in her diet rather than to her life of ease, by Dr. Thomas S. Gardner. This puts quite a dent in our defense, but we still say a life of ease doesn't hurt.*

● But not all queen bee news is so destructive. USDA scientists are all excited over the prospect of super bees. They have found a gas that induces the queen to lay eggs as soon as she reaches maturity. Thus she can be bred to her sons before she grows too old, producing desirable strains. Now to concentrate on super flowers to accommodate the super bees.

● *The National Pretzel Bakers Institute lets it out that they are planning to dedicate Reading, Pa., as the "pretzel city" because it was there that the combination of pretzels and ice cream originated. Where did ham and eggs get started, anyway?*

● At the behest of Secretary Anderson, USDA is planning "organized, sustained and realistic abundance." When Henry Wallace had the job they were practicing an economy of scarcity. Whatever enough might amount to elsewhere, it is definitely not that at USDA.

● *California, last year, again led the nation in per capita consumption as well as in volume of wine used. Per capita intake averaged 2.584 gal., according to the Wine Institute. Those chamber of commerce claims begin to make sense.*

● Opinion finders find many workers throughout the country who are agin' the Taft-Hartley Law, but who are all for the provisions of that law. Then there are others who like beef, potatoes, carrots, peas, onions and gravy, but who won't eat stew.

● *By way of quashing the fallacy that pickles and dairy products don't mix, The National Pickle Packers ask "How'd you like a pickle sundae?" With or without hot fudge sauce?*

● The Florida Citrus Commission has set up a dealer service representative in San Francisco, CALIF. The red badge of courage gets brighter and brighter. J.A.J.J.

Wheat In Eastern Dress

Australian producers of this new hydrolyzed wheat cereal—that can be cooked and eaten like rice—have been unable to meet Eastern demand. Production, which is only getting into stride, tops 7,000 tons annually

DEVELOPED during the war to pinch-hit for rice in the feeding of Australia's Asiatic Allies, a processed wheat cereal named Rycena is only now beginning to get into its stride. Seven thousand tons are shipped annually to Ceylon under a government contract and business in other parts of the Orient is just beginning to look up. Demand has outstripped the capacity of the original producer, Rycena Food Products, Melbourne, and ten mills in the Commonwealth are now grinding out the cereal under license.

To produce Rycena, wheat of preferably low gluten content is hydrolyzed at 180 deg. F., which destroys the active physical properties of the gluten in the endosperm of the grain. This operation also enhances the palatability of the product, and it is claimed that the food value of the gluten is not impaired in the process. The Rycena people do not want to tell what chemical agent is used in the hydrolysis operation.

In a subsequent mechanical phase of the process, the hydrolyzed wheat is stripped of part of the layers which constitute the bran. Simultaneously both ends of the grain are removed to open up the plant juice channels in the grain at one end while removing the germ at the other end. The removal of the outer layers permits quicker and better penetration of moisture when the cereal is cooked or steamed. Removal of the germ end obviates spoilage of the product through rancidity of the germ oil.

The mill consists of an outer casing, lined with milling wire, and an emery roller inside the casing. Clearance between the roller surface and the milling wire is slightly greater than the longitudinal axis of the wheat grain. The abrasive action tends to shorten the elliptical shape into a spherical contour by rounding the ends of the grain more rapidly than it attacks the skin at the side of the grain.

About 25 to 30 percent by weight are ground off as bran, and this constitutes a valuable byproduct which has a ready market as chicken feed.

The finished Rycena grain more closely resembles a barley corn than a grain of rice. It cooks somewhat more slowly than rice but gives one-third more bulk per volume of dry grain because of its greater water absorption.

A firm of public analysts places the vitamin B_1 content of Rycena at 0.83 milligram per pound, compared with 0.30 milligram for milled rice and 1.30 milligrams for whole wheat. Thus in processing of wheat to Rycena approximately 64 percent of the vitamin B_1 content is retained. The quantitative analysis was made by the fluorometric method involving the oxidation of thiamine to thiochrome.

Rycena is marketed in bags of 168 lb. net at £A50 ($166) per ton f.o.b. The current Indian buying price for Siamese rice is £STG28

(*Continued on page* 204)

Three Aspects

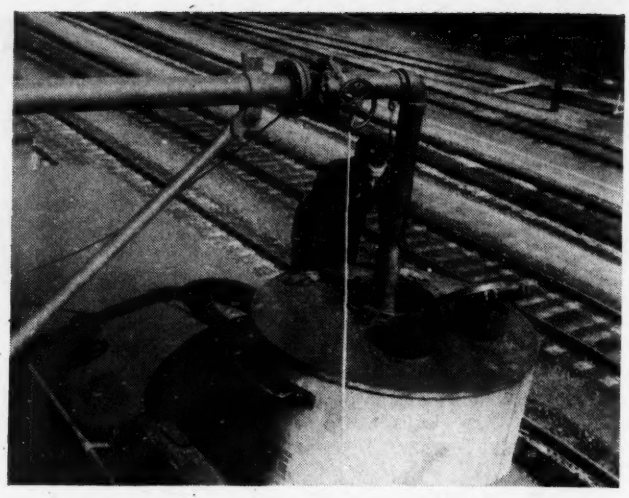
Rycena, the product described in this article, is somewhat similar to an Armenian wheat product. It may have possibilities for the American market, as well as serving as a rice extender for the Orient.

The Armenian product, known as Burghul, is a pre-cooked wheat product from which the bran has been removed. Usually it is used in coarse granular form, rather than as the whole kernel. Burghul is very palatable, serves much the same purpose as rice. A company was organized for the purpose of promoting this product, which was at one time offered to one of the large domestic food manufacturers.

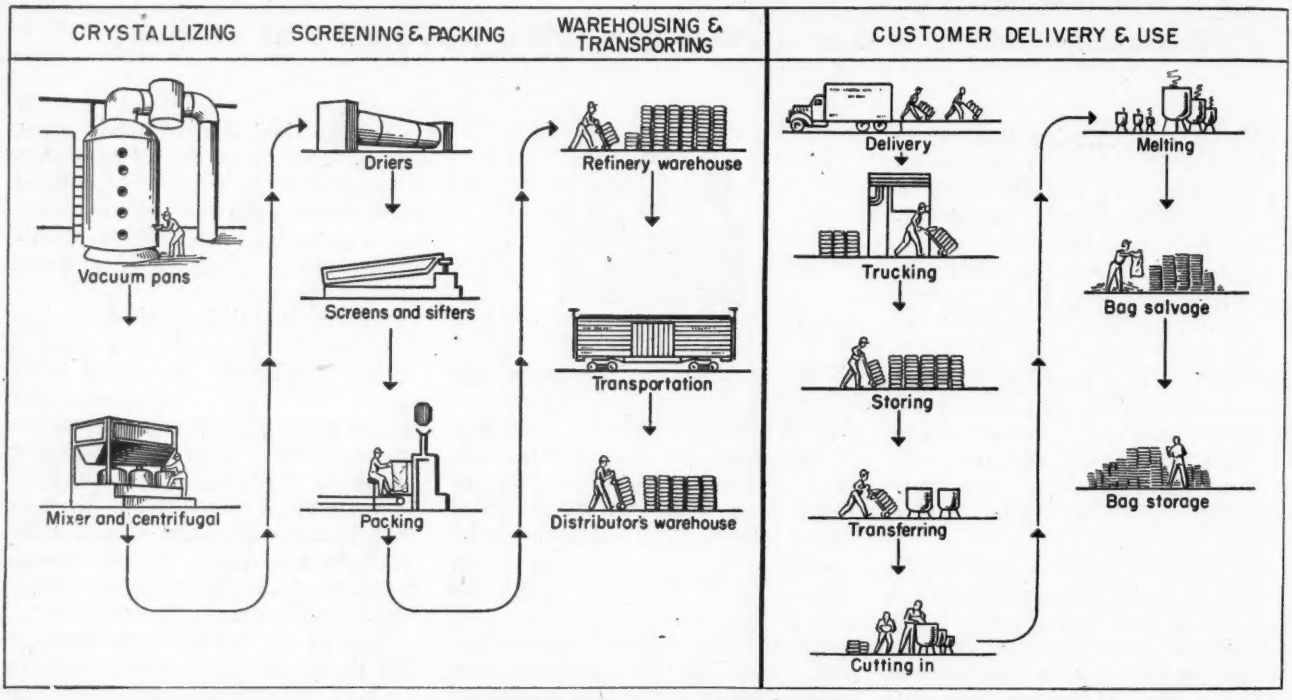
The new Australian product undoubtedly owes its appeal to a large extent to the degree to which the wheat is hydrolyzed. This feature should increase its taste appeal for Americans. Hitherto, wheat cereal products, with two or three well-known exceptions, have not been popular. A roasting treatment is usual.

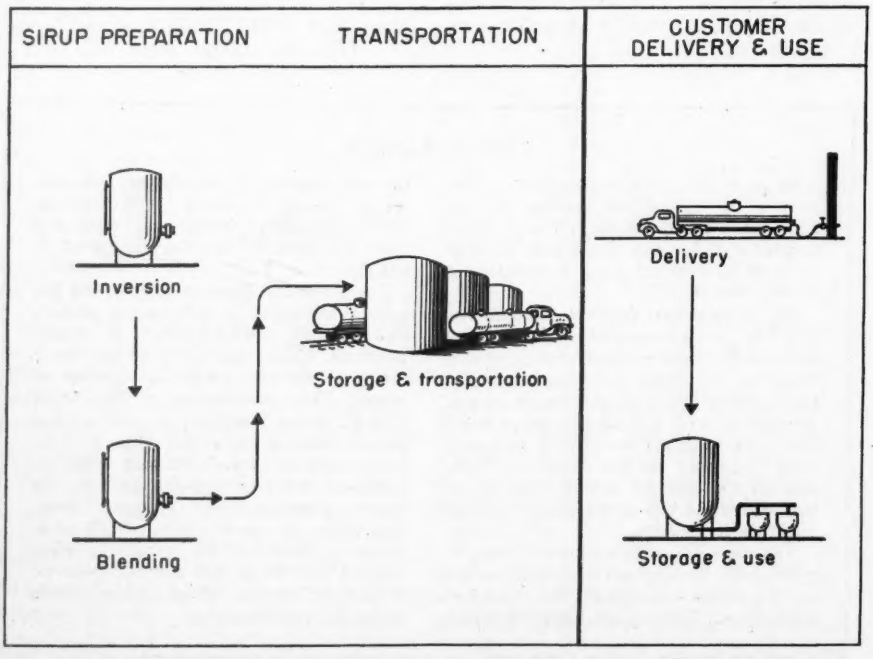
For Orientals, Rycena may be an important milestone in solving the age-old dilemma of maldistribution of cereal products. Starvation has been known in the past despite adequate supplies of wheat. This situation is all the more pointed when the West is producing a wheat surplus while the East is woefully short on rice. Educating tradition-blocked eastern populations in the proper processing and eating of western grains is almost hopeless. A processed occidental grain capable of being cooked and eaten like rice is, however, something which may automatically solve the problem.

TANK TRUCKS with capacities of 3,500 gal. are used to transport liquid sugar from the refinery to user's storage.



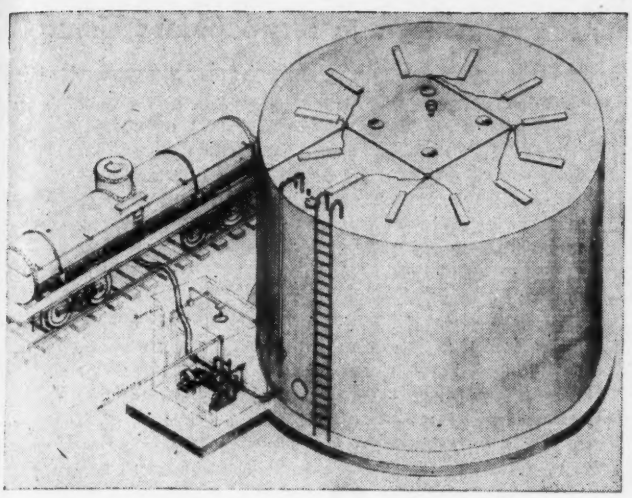
TANK CARS with 8,000 gal. capacities are used to transport liquid sugar to canneries further removed from the refinery.



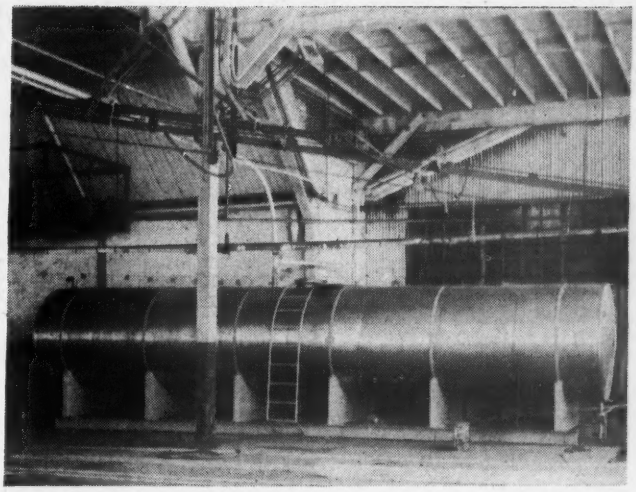


BAGGED SUGAR. (Above): Clarified and decolorized liquid sugar flows from the liquor gallery into vacuum pans, then through 8 steps before it is delivered to the customer. Seven additional steps are involved between delivery to the customer and its final use.

LIQUID SUGAR. (Left): Liquor from the liquor gallery is adjusted to a standard density for straight liquid sugar, or it is blended with invert sugar sirup to give a high-Brix invert sirup. It is then delivered by tank truck or tank car to the customers' storage tanks ready for use.



VERTICAL TANKS, for storage of liquid sugar, are equipped with germicidal lamps to control yeast, molds and bacteria.



HORIZONTAL TANKS with large capacities are usually placed on main floor or in basement. Sirup is pumped to processing.

Sugar in Bulk Aids Big Users

Users of as little as 7,000 bags per year may find it profitable to convert to bulk sugar, either liquid or granulated. In this article, advantages, precautions and required handling equipment are discussed

By ELSIE B. SCHMALZ, Assistant Pacific Coast Editor, "Food Industries"
San Francisco, Calif.

SUGAR in bulk, long sought by both refiner and large industrial user, is now a standard product, available in two forms, liquid and granulated. Liquid sugar best serves such manufacturers as beverage makers and canners, who usually convert sugar to sirup before using, while the dry form is used in making such products as preserves, chocolate, gelatin and dry mixes.

Liquid Sugar

The desirability of doing away with hundred-pound bags was realized as far back as 1925 when the idea of "liquid" sugar first originated in eastern sugar refineries. In the New York City area, it was reckoned that savings in bags and labor alone would amount to over $1,000,000 a year. Then, too, liquid sugar would answer the demand for an uncontaminated, easily handled product. But first some problems had to be solved.

In order to eliminate impurities without crystallizing, sugar refiners found it necessary to use special char treatment of the mother liquor. Refined Syrups & Sugars, Inc., Yonkers, N. Y., uses a dual treatment, both bonechar and vegetable carbon, to produce the water-white product demanded by bottlers and bakers. The California & Hawaiian Sugar Refining Corp., Crockett, Calif., produces a liquid sugar of acceptable color by means of a short life cycle and thorough revivification of spent bonechar.

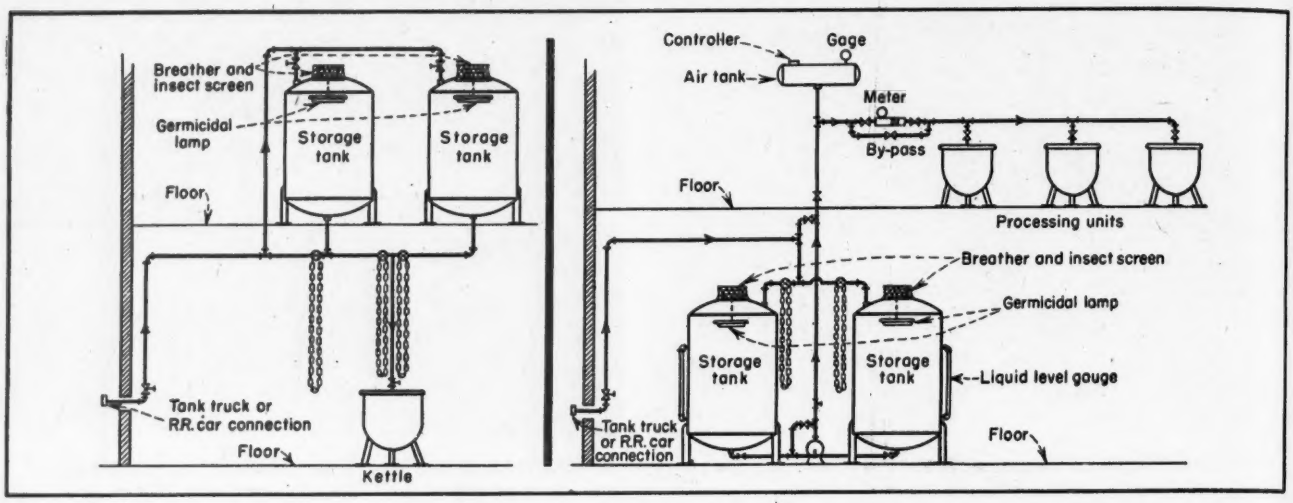
The susceptibility of surface layers of liquid sugar to attack by yeasts, molds and bacteria was found to be dependent on conditions of storage. Temperature conditions causing heavy condensation and drip-back of water vapor within the tank will lower the density and render the liquid less resistant to attack by these organisms. Practical solution of this problem has been afforded by installation of ultra-violet ray sterilizing lamps inside the top cover of the tank. Experience has shown that, under optimum conditions, storage periods of several months are entirely satisfactory. There is no danger of crystal formation if the liquid sugar is not used immediately, for the percentage of sugar solids is well below that required for crystallization. A yearly tank cleaning with a mild chlorine water wash should be standard procedure.

Use by Western Canners

Interrelated with the problem of storage was that of supplying the heavy seasonal demand of western canners, particularly in California, where over 96 percent of the nation's apricots and nearly 100 percent of its cling peaches and fruit cocktail are canned during less than three months of the year. With bagged sugar, warehouse stocks could be built up beforehand to meet the demand created by the overlapping of these packs, but as recently as 1945 it was impossible for the two West Coast refineries, California & Hawaiian Sugar Refining Corp. and Western Sugar Refinery, San Francisco, to supply canners with liquid sugar, made from daily production.

During the 1946 season, the sugar refineries and F. M. Ball & Co., Oakland, Calif., canner, worked out a plan of storage and delivery which would enable the canner to use liquid sugar even during the

Liquid Sugar Saves Handling in Plants That Convert Sugar to Sirup Before Using



STORAGE TANKS for liquid sugar may be located above or below cookers or kettles. When located above (left) liquor flows by gravity into processing equipment. When located on ground floor or in basement (right) pumping to process equipment is necessary.

cling peach pack. Adequate storage capacity was found to be the prime necessity.

At its Crockett plant, C and H first installed five storage tanks, having a total capacity of 250,000 gallons. Using his own tank truck, the canner kept a 10,000 gal. storage tank filled with liquid sugar from this supply. Other canners, further removed from the refinery, took delivery in tank rail cars and found expenses even less than operating their own trucks.

It was generally found that, to enable tank cars or trucks to shuttle continuously between refinery and cannery, and to give the canner a safety factor at times of heavy use or delayed shipments, storage tank capacity of about 100,000 gal. is advisable. With such storage room, the canner is able to receive deliveries at a rate faster than needed during the apricot season so that he builds up a reserve supply for the greater needs of the apricot-peach-cocktail overlaps, until requirements taper off again in the cocktail season.

With this supply plan, F. M. Ball & Co. was able in 1946 to use 90 percent liquid sugar in canning operations. This year, 100 percent liquid sugar is being used. Next year, C and H's million-gal. capacity storage tanks, now under construction at Crockett, will be ready for use.

Savings Effected

To the refiner, liquid sugar means a saving through the omission of several operating steps. Omitted are: Crystallization of sugar from char-filtered liquor; centrifuging to rid the grains of sirup; drying and screening sugar; packing into 100-lb. bags; warehousing and transporting bagged sugar. Instead, high purity sugar liquor off the char filters as it flows out of the liquor gallery is adjusted to a standard density for straight liquid sugar, or it is blended with invert sugar sirup to give a high-Brix, free-flowing invert sirup.

The savings effected by the sugar refiner are passed on to the user in the form of a price differential between liquid sugar (on the basis of sucrose equivalent) and bagged crystal sugar. Subject to fluctuations, this presently amounts to about 25 cents per hundred in the East and 30 cents in the West.

Distant Plants

For plants distant from the refinery, however, freight charges will eat up part or all of the differential price advantage. Since the freight rates for granulated sugar (bulk or bagged) and liquid sugar are the same, liquid sugar actually costs more to ship because of its water content. So, even with the favorable coastwise freight rates of the West, it is not economical to ship liquid sugar more than about 500 miles.

From the user's standpoint, the most important economic consideration is not the price differential but the in-plant savings accruing from the use of liquid sugar. These vary from 6 to 20 cents a hundred, depending on plant process, but savings will generally repay cost of installation of equipment in two to three years.

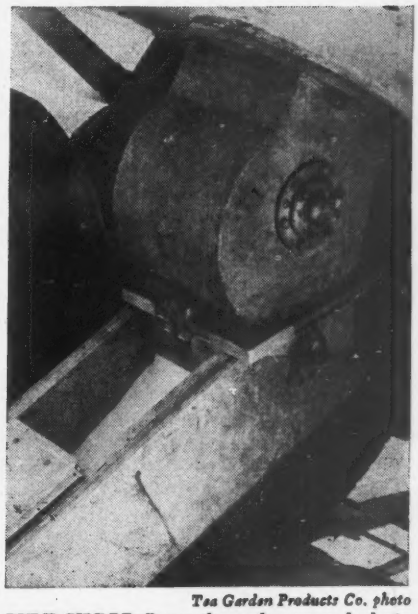
In-plant savings result from omission of several unit operations and increased smoothness of production, whether the liquid sugar is used in beverages, candy, sirups, ice cream, baking, preserving, or canning. These in-plant advantages are:

1. Labor savings. Liquid sugar flows by gravity or is pumped from tank truck or rail car to storage tank to processing kettles or mixing tanks. Omitted are all the steps attendant on handling bagged granulated sugar—hand trucking into plant and elevating to storage; piling for storage, then breaking stack for use; carrying sugar to process and cutting-in; salvaging empty bags. Gone, too, are the labor hazards of exhaustion, strain, and lowered employee morale from heavy manual work.
2. Storage space saving. To avoid piling and unpiling difficulties, sugar is sometimes stored only about six bags high. Even with higher piling, some space between bags and ceiling is usually wasted. Liquid sugar storage tanks can be built from floor to ceiling, utilizing all vertical space.
3. Uncontaminated product. Liquid sugar contains none of the dust and lint that often necessitate filtering sirup that has been made by shaking sugar from a sack into a melter.
4. Lower sugar losses. This amounts to as much as ½ lb. per bag from spillage, sifting and clinging of grains to sack.
5. Improved appearance and sanitation. No insect-attracting sugar on floor or machinery.
6. Availability of ready-blended invert sirup. Manufacturers are saved the trouble and expense of making this sirup, necessary to many products. Invert sirup gives a slight added sweetness; it keeps cream center confections moist and free from sugar crystals; it gives baked goods a golden brown color at relatively low temperatures and prevents dehydration of the finished product; it makes ice cream smooth in texture. Invert sirup is also the cheapest form, on the basis of sugar solids, in which to ship liquid sugar.
7. Smoother operation; better con-

Bulk Dry Sugar Is Ideal for Preserves, Chocolate, Gelatin and Dry Mixes

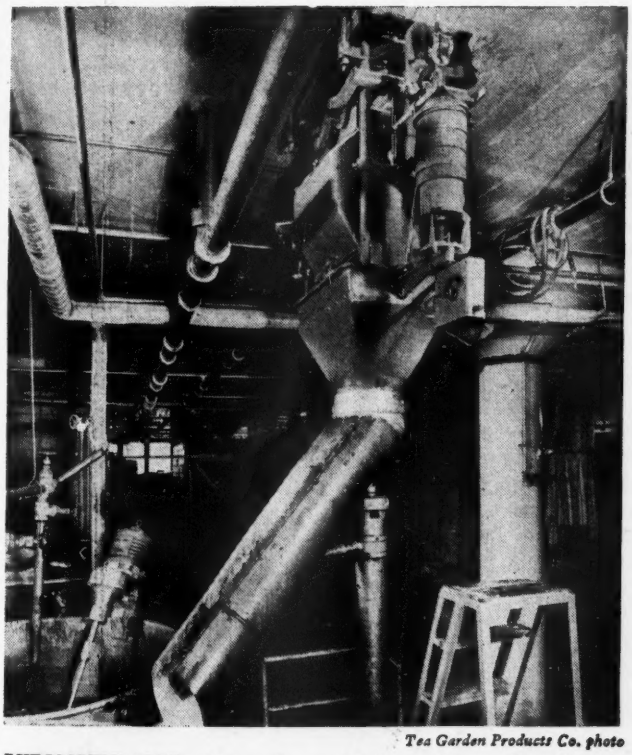
Tea Garden Products Co. photo

TANK TRUCK of Western Sugar Refinery delivering 20,000 lb. of bulk granulated sugar into receiving bin of Tea Garden Products Co., San Francisco, Calif.



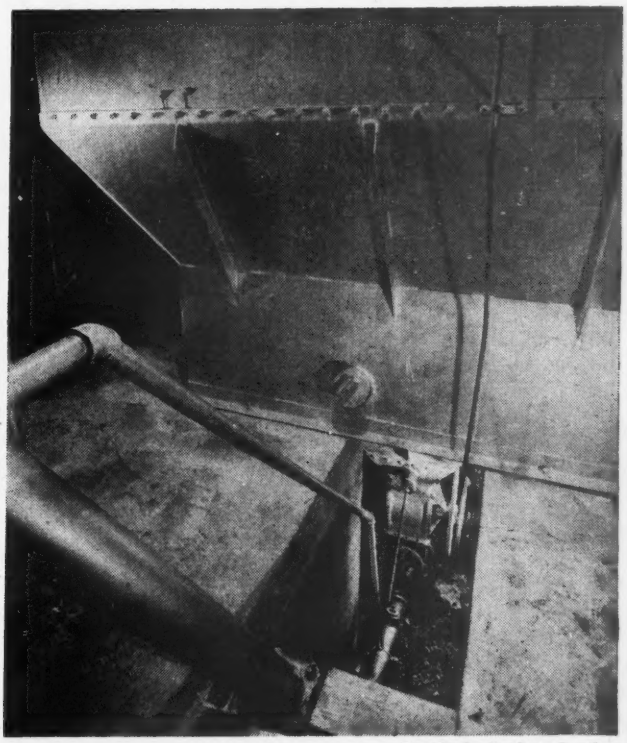
Tea Garden Products Co. photo

BULK SUGAR flows through covered chute from tilted truck to Tea Garden's bin.



Tea Garden Products Co. photo

AUTOMATIC 100-lb. trip scale over jelly station at Tea Garden Products Co. Swinging spout can serve 9 kettles.



Tea Garden Products Co. photo

SUGAR is picked up from bottom of storage bin by compressed air and delivered to cooking kettles on upper floors.

trol. Sugar is delivered quickly and conveniently. In less than one hour, 25,000 lb. of sugar solids may be pumped into user's tank. Weighing dry sugar into process is eliminated; meters or calibrated tanks measure exact amounts needed.

8. Continuous operation is more nearly approached.

Equipment

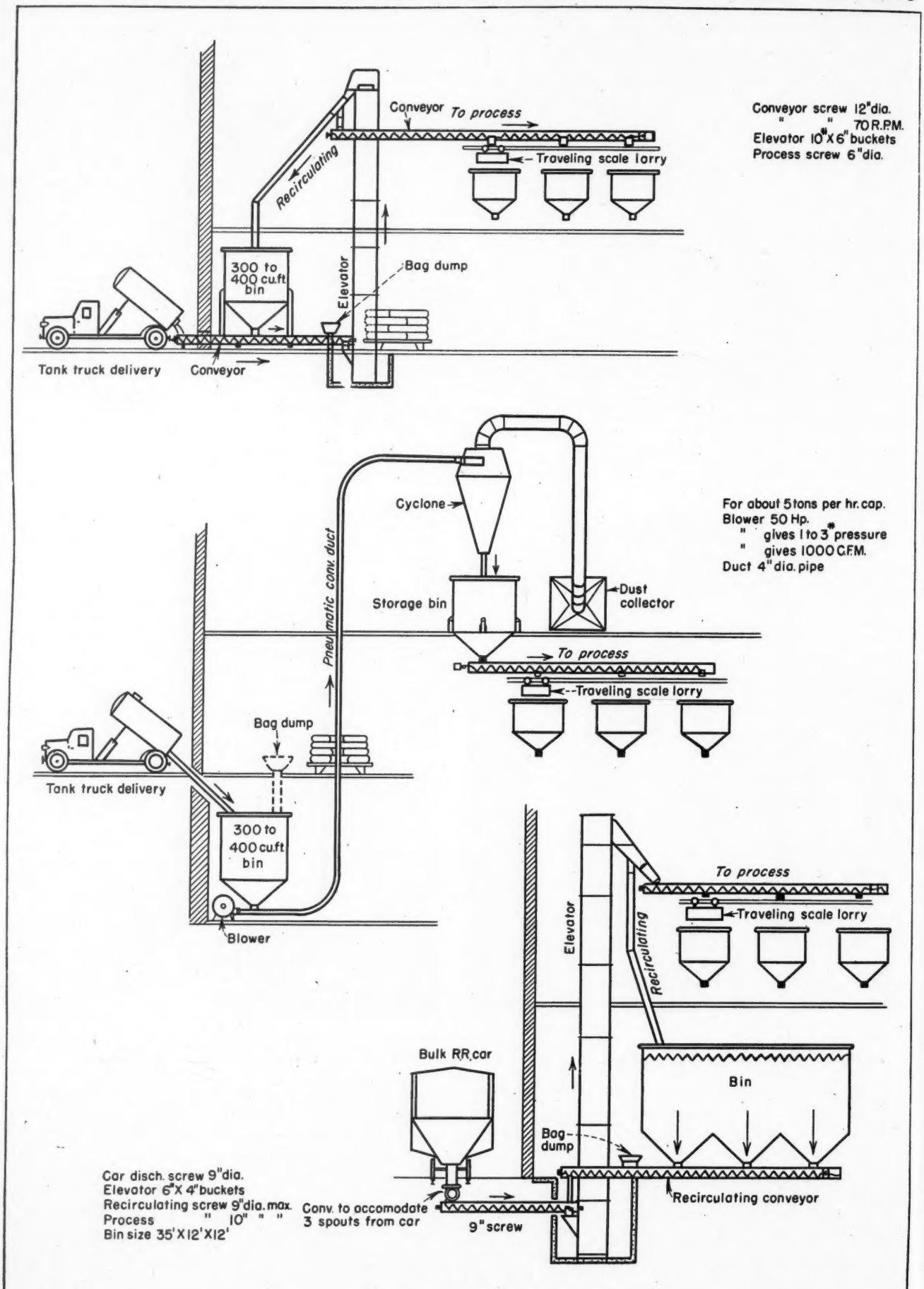
Conversion to the use of liquid sugar entails the use of special equipment by both refiner and user. The sugar refiner needs tank cars or tank trucks, also storage tanks at the refinery and at distribution stations. Users need storage tanks, pumps, piping and meters.

Tank railroad cars of 8,000-gal. capacity may be bought or leased by refinery or user. Cars are usually lined with baked plastic material which does not easily fracture. With refinery-leased rail cars, user provides own pump, car connection and lines to tank storage.

Tank trucks are trailer type, made of stainless steel, or they may be plastic lined. For economic reasons, capacity is the maximum allowable, usually 3,500 gallons. Each truck has a self-contained gasoline-powered pump which unloads to user storage. User provides connection to storage tank.

User's liquid sugar storage tanks may be located either above or below cookers or kettles. If above, liquor flows by gravity into proc-

In-Plant Methods of Handling Bulk Granulated Sugar From Receiving to Processing



ess; if below, pumping to process is necessary. Since considerable building stress is entailed by a 110,000- to 115,000-lb. tank located two or three stories high, it is usually preferable to place tanks on main floor or basement. Cost of pump operation is nominal and is offset by less exacting building regulations and lower construction and insurance costs. Tanks should be located where temperature is uniform to prevent condensation of water vapor within the tank.

Two or more storage tanks will give greater flexibility of operation than only one. The space available will usually dictate shape, but they may be horizontal or vertical, cylindrical or rectangular. If low density sirup is to be used, the vertical cylindrical type is preferable, since ultraviolet sterilizing lamps can more readily be installed. Tops and bottoms of all tanks should be oval or conical with rounded corners. Proper combination of breather vent and air filter, manhole, and sterilizing lamps is essential to successful storage. While stainless steel tanks are highly satisfactory, baked plastic linings afford excellent and enduring protection to sirups.

Pumps handling liquid sugar should be positive displacement, either plunger or rotary. Brass or bronze fittings are safest when pumping sirup, while all-brass or stainless steel will give complete protection from contamination. Most popular size for tank car unloading is a 3 in. pump with a 4 in. suction line, giving an unloading rate of 85 to 120 gal. per minute. Line should connect into or near bottom of storage tank.

Pumps from user's liquid sugar storage tank to process are usually electric-driven, equipped with relief valves, and controlled by one of three methods:

1. A small supply tank located above the process, filled by intermittent pump operation and controlled automatically;
2. A small pressure tank, located between pump and process;
3. Manual control of pump from point of usage.

If sufficient steam pressure is available, a standard duplex steam pump equipped with a pressure governor will provide a fully automatic and extremely flexible arrangement.

The material used for piping liquid sugar to process depends on the kind of food handled by the plant. Monel, Inconel or stainless steel tubing is best for certain products, but the usual recommendation is brass or copper. In some cases, galvanized iron piping is satisfactory, though there is some danger that the inside galvanizing may gradually dissolve and the exposed iron rust.

Piping size will depend upon the type of sirup to be handled, its temperature, the rate of delivery desired, the length of line and the pressure available.

Control valves should be gate or plug type.

Metering is the most convenient way of dispensing liquid sugar. Because of the density of the liquid (over 66 percent solids), a meter of volumetric displacement, piston type, is best. Liquid sugar meters should be of brass or bronze internal construction and should be checked for accuracy at regular intervals. Meters are available with indicating dials and totalizing registers; they may be equipped with an electric alarm or shut-off valve that is actuated when a predetermined amount of fluid has been measured, making operation completely automatic. Kind and capacity depend on process.

Bulk Granulated Sugar

Shipment of dry granulated sugar in bulk by tank trucks has been standard practice for some refiners for many years—particularly in the East, where short hauls to large users made it economically feasible. Midwest industries, however, could not be served until development of bulk sugar rail cars enabled shipment from the bulk storage bins of beet sugar factories in the Mountain States. Now, West Coast industries have so increased capacities that tank truck deliveries of bulk granulated sugar are practicable.

Manufacture and Shipment

For the cane sugar refiner or the beet sugar processor, bulk dry sugar production costs slightly less than sugar in bags because of the elimination of bag, packaging, warehousing and loading costs. Very little extra equipment is needed, frequently only conveyors from process or bulk sugar bin to tank car or truck. For transportation, however, specially designed rail cars or tank trucks must be used.

Bulk sugar rail cars must be completely sealed against dust and sugar leakage, and must be easily loaded and unloaded. Such cars, now designed and built by General American Tank Car Co., have a capacity of about 100,000 lb. Discharge is by gravity, through bottom openings of three properly sloped hoppers. The openings are placed over inlets to a sunken bin and over three screw conveyors leading to bins inside the factory.

Modern tank trucks for transporting dry granulated sugar in bulk from refiner to user are trailer type, usually of stainless steel construction, and about 200-bag capacity. These trucks are filled by gravity and discharge into user's receiving bin either by screw conveyor or by up-ending the tank to an angle of 40 deg., slightly over the angle of repose for sugar. Truck is tilted by built-in hydraulic lifting equipment.

In-Plant Use of Bulk Dry

For the manufacturer whose product would be impaired or process retarded by the use of liquid sugar, or who uses sugar in grain or powdered form, bulk granulated offers many of the savings effected by liquid sugar—both price differential and in-plant economies—and presents no problem of possible spoilage during storage. Careful timing of deliveries is advisable, but the danger of running short is minimized by a receiving bin scaled to sugar consumption and by keeping some bagged sugar on hand ready to be cut-in to the system in case of a delayed delivery.

Tea Garden Products Company, San Francisco, Calif., manufacturers of preserves, jams and jellies, finds its 30,000-lb., bulk dry receiving bin adequate for a daily consumption of 1,000 bags of sugar, though peak season demands require daily fillings. This company's installation features a pneumatic conveying system from its basement bulk bin to processing kettles on the third and sixth floors. The 50 hp. blower with its 4-in. pipeline is capable of moving 150 lb. of bulk granulated sugar a minute through a vertical rise of 100 ft. and a horizontal distance of 150 ft. To deliver an equivalent amount of bagged sugar by hand-truck and elevator to the processing kettles would require many man-hours a day.

Smooth operation of this system was not achieved without a lengthy trial-and-error period. The present optimum air-pressure of about 4.5 lb. per sq. in. was arrived at after a pressure of 5 lb. was found to cause striation of the sugar grains with consequent higher than tolerable dust formation. To trap the sugar dust formed in the air-borne stream, a dust collector with long

(*Continued on page* 206)

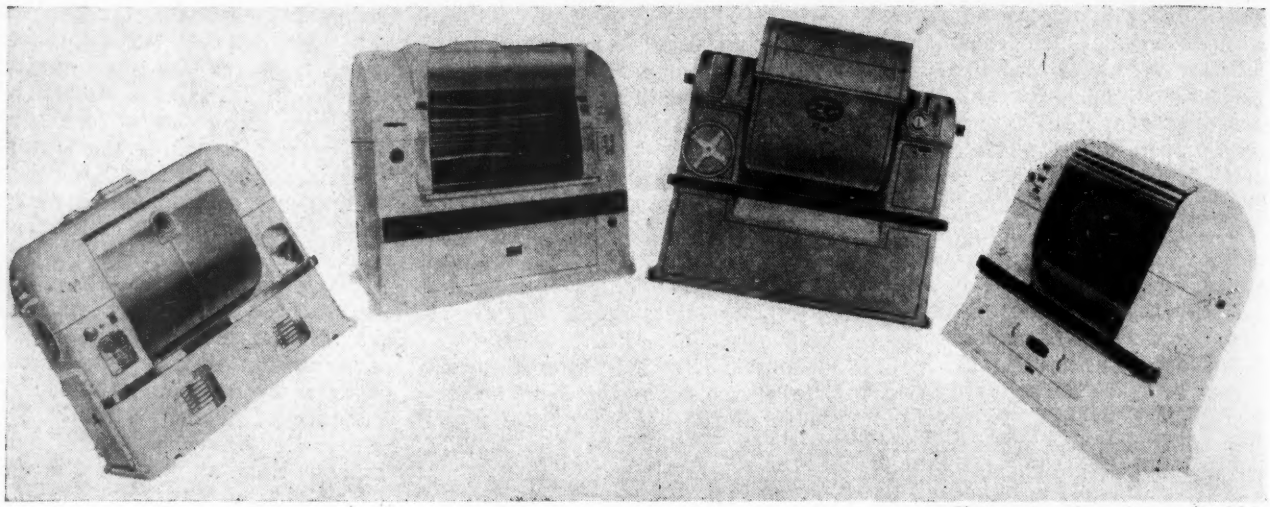


Photo courtesy of manufacturers listed below

DOUGH-MIXERS are good examples of food processing machinery employing gear motors. Mixers (left to right) made by Baker Perkins, Inc., Saginaw, Mich.; Champion Machinery Co., Joliet, Ill.; J. H. Day Co., Cincinnati, O.; Read Machinery, Inc., York, Pa.

Gear Motors In Dough-Mixers

They provide the high torque necessary for starting and accelerating heavy dough mixes and for handling loads of a highly pulsating nature

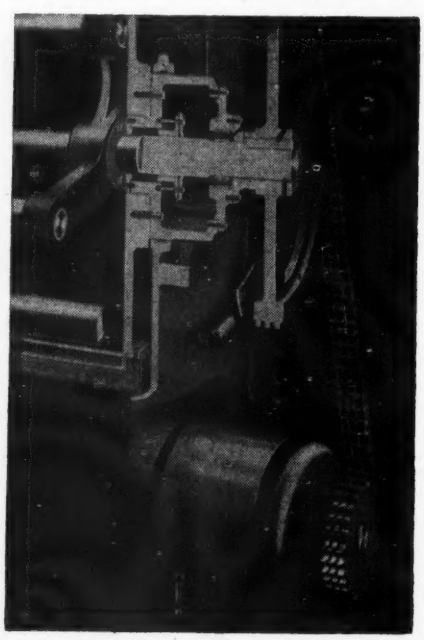
By L. S. SHERMAN, Gear-Motor Division, Motor Divisions
General Electric Company, Schenectady, New York

ELECTRICALLY and mechanically, the gear motor has reached the point where it is widely considered an economical, compact and efficient power source for use on food processing machinery. The versatility of gear motors generally, with their wide range of horsepower, output speeds, and mounting arrangements, make them ideal for the specialized drives required by this particular type of machinery.

A gear motor consists of a highly efficient helical-type gear-reduction unit built integrally with, and driven by, a standard normal speed ball-bearing motor. The relatively simple gearing is usually supplied with an 1,800-rpm. motor, which has a good balance of desirable characteristics necessary to provide an ample variety of output speeds.

One of the most successful applications of gear motors in the food processing industry today is in dough-mixing machinery. The two-speed gear motor unit is mounted horizontally in the lower section of each mixing machine, with a silent chain or a V-belt drive up to the agitator shaft, which runs horizontally through the mixing bowl. The agitator is designed to exert a combined rolling, kneading, and throwing effect on the dough. It revolves at 60/30 or 80/40 rpm., reduced by the chain or V-belt drive from the gear motor shaft speed of 280/140 or 190/95 rpm.

Operation is as follows: After the mixing compartment (or bowl) is charged with the required ingredients the mixer is started at low speed to facilitate blending and to prevent excessive splashing of the mass of flour and liquid. After 30 to 90 seconds at low speed (for white bread), the gear motor is switched to high speed for a run of from six to 15 minutes. The dough is then dumped. (This process often involves some jogging in order to empty the compartment completely.) The mixer is then recharged for another cycle of operation.



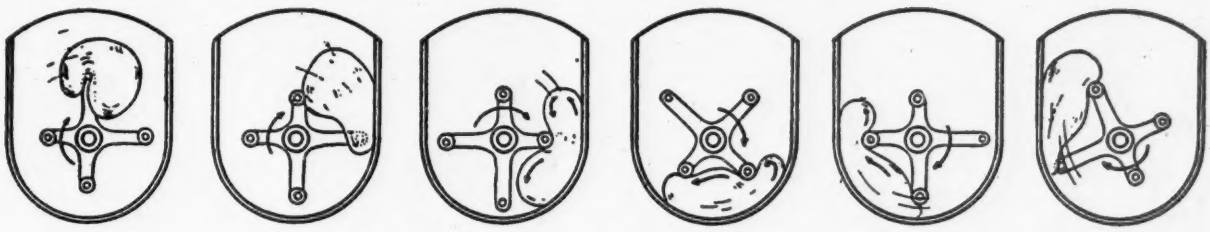
AGITATOR DRIVE is by a two-speed gear motor with a silent chain or V-belt.

For mixing heavier doughs, such as for whole wheat bread, a run of about 15 minutes' duration may be conducted throughout at low speed.

Just as dough-mixers are built in a wide range of sizes to meet the needs of different sized bakeries, gear motors for these mixers are available in a variety of horsepower ratings. The two-speed gear motor units range in size from 5/2½ hp. up to 50/25 hp. These horsepower ratings are available for all types of power supply.

Dough-mixer gear motors are generally built with specially designed two-speed, constant torque motors, 1800/900 rpm. rated 40 deg. C. continuous high speed, and 50 deg. C. one-hour low speed. A special rotor construction is used to

Sequence Drawings Show Typical Dough-Mixer Action



1 Pick up bar carries dough mass up and over to rear of bowl.

2 First kneading roller engages and rolls gently into the dough.

3 Dough moves forward while first kneading roller rolls over it.

4 Second roller engages and kneads dough into a different shape.

5 Third roller engages and kneads dough in another position.

6 Pick up bar again engages dough and the cycle is repeated.

provide the high torque necessary for starting and accelerating the heavy dough mixes, yet starting current is limited to a low value. This low starting current is particularly desirable, since many bakeries are located in suburban areas where high-starting currents would cause objectionable line disturbances. The sturdy rotor construction minimizes the possibility of rotor burn-outs even with moderate overloads. This is due to the special design of the rotor bars, from which extra thermal capacity is obtained without the sacrifice of starting torque.

It can be seen from the agitator design that the torque imposed on the gear motor is of a highly pulsating nature, which is an important consideration in gear motor application. These peaks occur with each revolution of the agitator shaft and usually amount to 150 percent or more of full-load torque. The concentric-shaft planetary type of gear reduction is ideally suited to handle such load conditions, since it provides uniform distribution of stresses throughout the gear assembly.

Gear motors are available in a wide range of standard output speeds—from 13.5 to 780 rpm.—and in all industrial motor types. In addition, they can be used with all types of drives—belt, chain, pinion and direct connected. Furthermore, they are as adaptable as standard motors are to various enclosures, mounting positions and speed control systems.

It has been estimated that 70 percent of all motor applications in industry require a speed reduction of one type or another. The wide use of gear motors as a practical and economical drive for dough-mixers definitely indicates that they offer a solution to most problems in the food industry field involving low speed drives, especially with loads of a pulsating nature.

Consumers Prefer Low Overrun

Ice cream testing trial shows that more is involved than higher fat content

IN the commercial manufacture of ice cream, has too much emphasis been placed on butterfat—too little on overrun? Results of an ice cream tasting demonstration, held at the Dairy Industry Conference at Cornell University in September, seem to indicate that this is true.

Of four vanilla flavored ice creams, sampled by over 400 dairy plant executives and scientific personnel attending the conference, the difference between one containing 10 percent butterfat, 12 percent solids-not-fat, 0.37 percent stabilizer, with an overrun of 61 percent and another containing 16 percent butterfat, 10 percent solids-not-fat, and 0.25 percent stabilizer, with 89 percent overrun, was barely discernible.

Two other ice creams: One of 16 percent butterfat, 10 percent s.n.f., with no stabilizer and 90 percent overrun, and one of 10 percent butterfat, 12 percent s.n.f., and 0.37 percent stabilizer, with 90 percent overrun, placed third and fourth, respectively. All samples were made from fresh milk products, sugar and pure vanilla, and frozen in a direct expansion batch freezer. By present day standards, when a majority of the ice cream is frozen in continuous freezers, none of the samples was particularly smooth. The final results, however, would probably not have been greatly different had the samples been frozen in a continuous freezer.

For the demonstration, a paper plate marked 1, 2, 3, 4 was given to each taster. As he moved by a storage cabinet attendants dipped portions from each of the four sample cans and placed them upon the number corresponding to the sample number. Score cards, listing a number of characteristics, such as best ice cream, poorest ice cream, highest fat content, lowest fat content, too much stabilizer, too little stabilizer, too sweet, etc., were given to each taster.

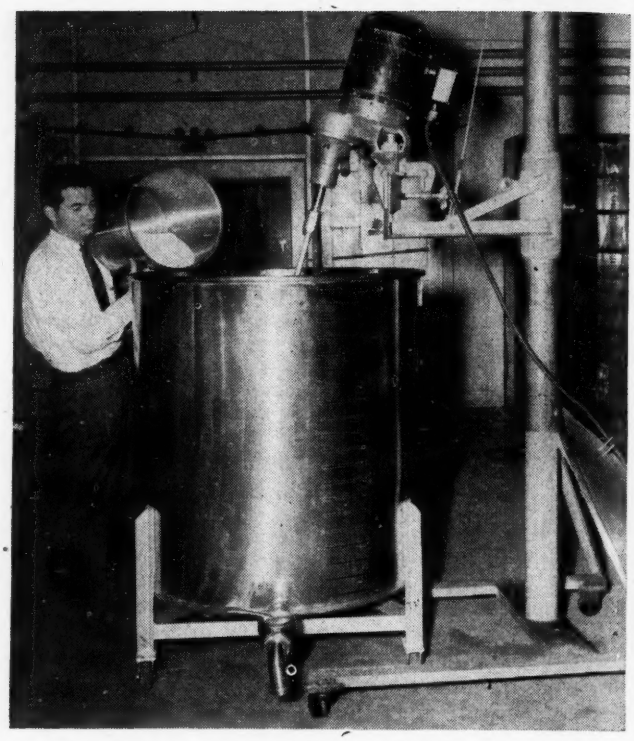
Tasters were permitted to return for second helpings when this was necessary in order to verify their

(*Continued on page* 207)

Analyses and Ratings of Ice Creams.

Sample No.	Analysis—percent				Cost Per Gal.	Tasters, Rating
	Butterfat	S.N.F.	Stabilizer	Overrun		
1	16	10	0.00	90	$0.99	3
2	10	12	0.37	87	$0.71	4
3	16	10	0.25	89	$1.00	1
4	10	12	0.37	61	$0.82	2

LABORATORY PREPARATION of cold-processed fruit gels. Puree is mixed with a sugar-pectin mixture, using a mechanical mixer.



COMMERCIAL TYPE EQUIPMENT used to make new gelled fruit products at room temperature without beating air into product.

New Fresh-Fruit Spreads

Frozen jam and jelly-like products, prepared without heating, have lower

By GESTUR JOHNSON* and MILDRED M. BOGGS
Western Regional Research Laboratory**, Albany, Calif.

TWO new fruit spreads which retain the natural full flavor, aroma, and color of the fresh fruit have been developed in this laboratory. These new products can be used as spreads similar to ordinary jellies and jams. A clear product, similar to jelly in appearance and texture, is made with fruit juice. A jam-like product is made with fruit puree. The retention of volatile flavor constituents, which are ordinarily lost, altered, or destroyed in conventional methods involving boiling, is due to the fact that heat is not applied at any stage, and preservation is accomplished by storing at 0 deg. F., or lower.

These new spreads require the addition of sugar, pectin, and, in some cases, a small amount of fruit acid to the juice or puree during preparation. The cold process of gelation and the method of freezing preservation are identical for both products. The soluble solids content, approximately 56.5 percent, is somewhat lower than that of ordinary jellies and jams,*** but this is desirable in order to avoid masking the fresh-fruit flavor and also for greater ease of preparation.

This report is preliminary in nature, and the more fundamental factors in regard to nature and behavior of pectin used, acid-pectin-sugar relationships, ascorbic acid retention, effects of prolonged storage, and others will be discussed later in detail. Sufficient work has been done to indicate that the products have desirable characteristics not possessed by the usual jellies and jams. Their ease of manufacture and retention of fresh flavor and aroma have stimulated commercial interest.

It has been recognized for some time that boiling temperatures during preparation are not necessary for pectin gel formation. Olsen[1] reported that "apple pectin jellies rapidly prepared at 55 deg. C. have abnormally high jelly strength as compared with jellies prepared by the short-boil method." Spencer[2] prepared pectin gels by mixing sugar sirups, acid, and pectin solutions at room temperature. Baker and Pheteplace[3] stated that with proper proportions of the three essential factors in jelly making—pectin, acid, and sugar—a jelly can be made "in the cold." Baker and Goodwin[4] described a low-temperature canned jellied cranberry sauce. Boggs and Johnson[5] also describe a cold-processed cranberry jelly made from heat-extracted cranberry puree and preserved at freezing temperature.

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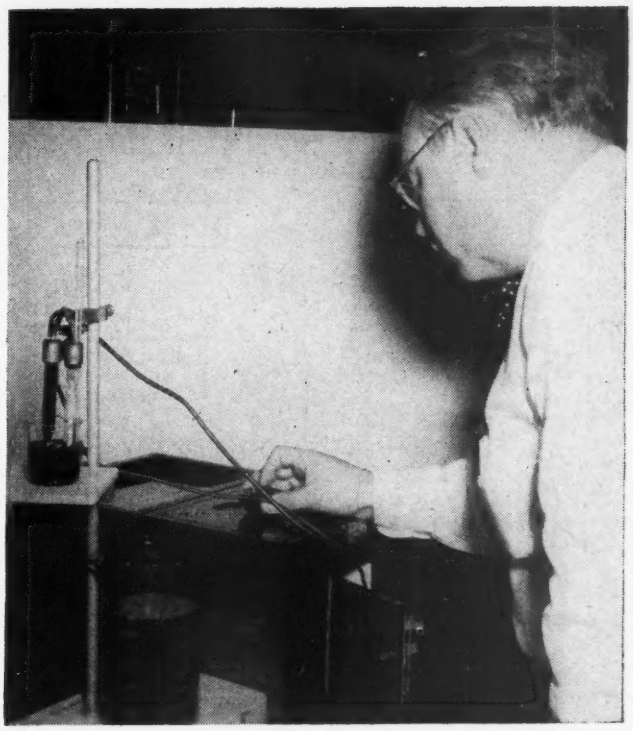
*Resigned Aug. 16, 1946.
**Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.
***Since the articles described herein not only contain less soluble solids than jams and jellies as standardized under the Federal Food, Drug, and Cosmetic Act, but differ from the standardized products in other respects, they should not be labeled as or otherwise represented to be jellies or jams. Interested persons should communicate with the Food and Drug Administration, Washington 25, D. C., if further information regarding the application of the Act to these articles is desired.

SOLUBLE SOLIDS content of fruit puree is measured with a refractometer, using sucrose scale. Raspberries were first test fruit.



TO ADJUST the pH of purees to 3.0 with jelly maker's standard fruit acid, pH's are determined with a pH meter.

Preserved By Freezing

soluble solids content. Flavors are superior to ordinary jams and jellies

The new products are made from freshly prepared fruit purees or juices, or those preserved by freezing without added sugar. Any fruit with a pH of approximately 3.0, or which can be adjusted to that pH by addition of fruit acid, can be used. The process involves the following steps: (1) Disperse and dissolve dry, rapid-set (high methoxyl) citrus pectin, mixed with sugar or glycerine, in fruit puree or juice. The soluble solids content should not be over 25 percent after the addition of the pectin. (2) Increase the soluble solids to 56.5 percent by the addition of sugar. (3) Package and allow the mixture to set to a gel before it is placed in freezing storage. As is usual, the products are defrosted prior to use.

The procedure of combining the ingredients (Figs. 1 and 2) was adopted because it facilitates dispersion and dissolution of the pectin and because it involves a minimum introduction of air. Avoidance of aeration is particularly important when clarified fruit juices are used. Steps in the procedure are:

1. The soluble solids content of the fruit puree or juice is measured with a refractometer, using the sucrose scale. pH is determined with a pH meter. If the pH of the fruit puree or juice is greater than 3.0, adjustment to pH 3.0 $\pm$ 0.05 is made by the addition of jelly maker's standard fruit acid.

2. The puree or juice is divided into two portions in the ratio of 60 to 40.

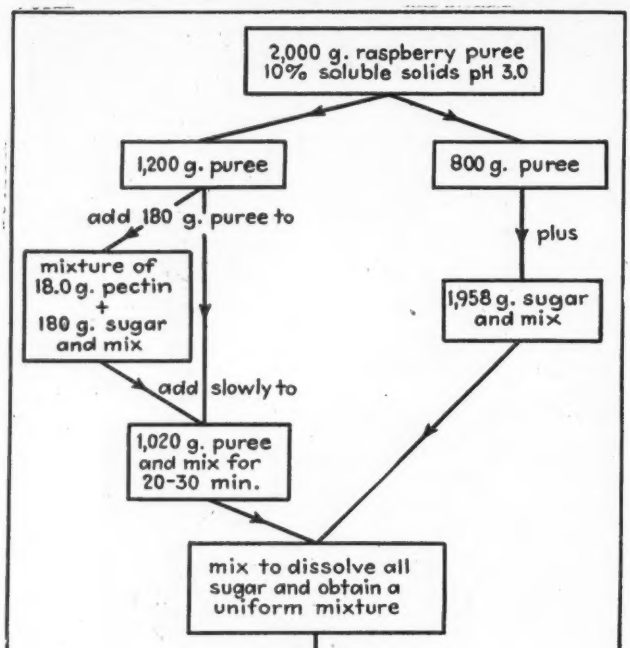
3. Rapid-set citrus pectin, approximately 0.45 percent of the weight of the final product (puree + sugar) for 185 to 200 grade, is dispersed and dissolved as follows: The pectin is mixed with eight to ten times its weight of sugar. An amount of puree or juice equal in weight to this sugar is taken from the 60 percent portion and added to the pectin-sugar mixture. The mixture is stirred until all of the sugar is dissolved. This step helps dispersion by allowing the particles to become wetted without much swelling. The concentrated pectin mixture is then added to the remainder of the 60 percent portion of puree or juice and mixed for 20 to 30 minutes with a mechanical mixer of a type that does not beat air into the product. The soluble solids content at this stage should not exceed 25 percent. A higher sugar concentration will interfere with proper dissolving of the pectin. As an alternative and somewhat simpler procedure, the dry pectin can be mixed with approximately 2.5 times its weight of glycerine, and then added slowly to the 60 percent portion with constant stirring for 20 to 30 minutes (Fig. 2). The small amount of glycerine needed to disperse the pectin makes it possible to dissolve pectin in purees already containing as high as 20 to 25 percent soluble solid. The addition of glycerine has other advantages which will be referred to below.

4. The calculated amount of sugar required to increase the soluble solids of the final product to 56.5 to 57 percent is mixed into the 40 percent portion. The greater part of the sugar will dissolve. Amount of sugar required to increase soluble solids to 56.6 percent can be calculated from the following equation:

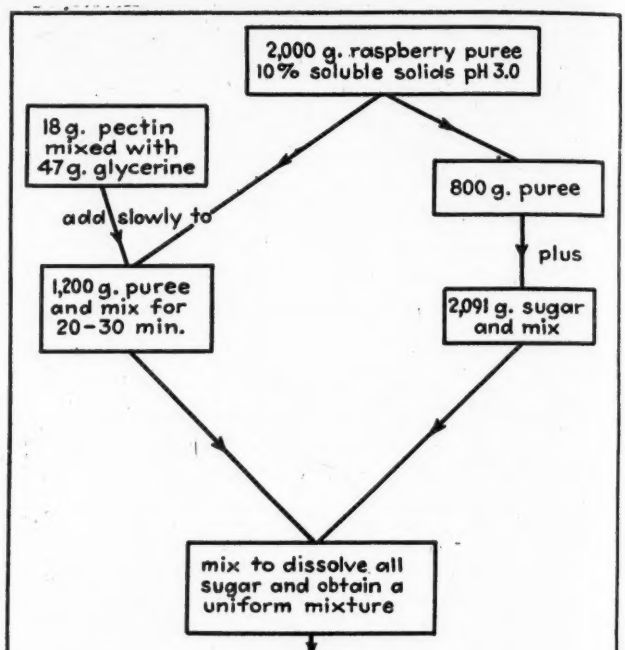
$$x = \frac{0.565y - \frac{s.s.}{100}(y)}{0.435}$$

x = weight of total amount of added sugar.
y = weight of fruit puree.
s.s. = percent soluble solids in fruit puree determined by Abbe refractometer, using the sucrose scale.

Sugar or Glycerine May Be Used for Dispersing Pectin in Making Gels



SUGAR is used for dispersing the pectin before it is used in the preparation of raspberry gelled fruit.



GLYCERINE is added in small amounts to disperse pectin in the manufacture of raspberry gelled fruit.

The amount of sugar to be added to the 40 percent portion then becomes x, less the amount of sugar or glycerine added to the pectin.

5. This mixture is added to the 60 percent pectinized portion, and stirring is continued until all of the sugar is dissolved and a uniform mixture is obtained (approximately five minutes).

6. The product is packaged in heavily waxed paper containers (6 oz. or larger, if desired), and allowed to stand until properly gelled. This requires 20 to 24 hours.

7. The gelled product is placed in freezer storage (0 deg. F., or lower).

The mixing process as described above is carried out at room temperature (70 deg. to 75 deg. F.) and calls for rapid-set citrus pectin. Rapid-set apple pectin can be used, but the apple pectins tried were more difficult to disperse and dissolve. Consequently, a longer mixing time was required.

Factors Affecting Gelation

The pectin-pH-sugar relationship in this process was selected in order that gelation would approach equilibrium in 20 to 24 hours. Under these conditions the rate of gelation is so slow as to be non-apparent during the last stage of mixing and during packaging. Sufficient time is thus allowed for this part of the process. The above-described relationship must be accurately controlled in order to obtain a product of good texture and optimum gel strength. If the pectin-pH-sugar relationship is incorrect, the product may fail to gel, or gelation may start before mixing and packaging are complete, thus interfering with gel formation and adversely affecting texture.

A soluble solids content of 56 to 57 percent is desirable not only from a flavor standpoint but also for ease of manufacture. Above 60 percent, sugar becomes more difficult to dissolve and the rate of setting increases. The gelling power of rapid-set pectin with this process is sufficient at the 56 to 57 percent soluble solids level to obtain good efficiency of the pectin. The efficiency, however, drops rapidly below this sugar level and also when pH is increased above 3.1.

Amount of Pectin Needed

The amount of pectin required varies little with different fruits after adjustment to the same pH. The red currant and guava used in this investigation required less pectin than some of the other fruits used, such as the berries and Santa Rosa plum. The maximum amount of pectin required does not exceed 0.5 percent at pH 3.0 and soluble solids content of 56.5 to 57.0 percent when rapid-set citrus pectin, grade 185 or higher, is used.

With 150-grade pectin, the requirement would be proportionally higher. The optimum amount for a given lot of fruit puree can best be determined by making small experimental batches. If the fruit has a pH of 3.5 or slightly higher, it may not be practical to lower the pH to 3.0. In such cases the fruit can be used, provided the amount of either pectin or sugar, or both, are increased.

The composition of some of the purees and clarified juices and the gels prepared from them is listed in Table I. All of the gels had desirable texture and gel strength. The guava sample did not require added acid. Different varieties of guava, however, vary greatly in acidity. Consequently, some varieties may require a considerable amount of added acid. The puree and juice as given in Table I for the same fruit were not from the same lot of berries. Differences in composition are not necessarily due to clarification.

Effect of Storage

Six gels were stored at +15 deg. F., +7 deg. F., 0 deg. F., –10 deg. F. and –30 deg. F. They were tested for granulation and flavor, and observed for syneresis at approximately monthly intervals up to seven months. The compositions of the gels are listed in Table II. These samples were prepared and their quality evaluated in cooperation with Tea Garden Products

New Fruit Gels Have A Desirable Texture and Gel Strength

TABLE I—Composition of Fruit Purees and Juices and Gels Prepared From Them.

Fruit	Fruit, pH	Acid added,[1] percent	Gelled fruit, pH	Soluble solids of fruit	Puree or juice, grams	Sugar, grams	Soluble solids in gelled fruit, percent	Added pectin,[2] grams	Added pectin, percent
Blackberry puree	3.22	0.50	3.02	10.5	2000	2116	56.5	18.2	0.44
Boysenberry puree[1]	2.90	0.00	2.90	10.5	2000	2116	56.5	17.7	0.43
Boysenberry puree[2]	3.25	0.35	3.05	10.7	2000	2040 60g. glycerine	56.5	18.6[3]	0.45
Currant (red) juice	2.85	0.00	2.85	9.5	2000	2110	56.0	15.2	0.37
Guava puree	3.05	0.00	3.05	9.5	2000	2110	56.0	10.3	0.25
Red raspberry puree	3.15	0.25	3.00	10.0	2000	2145	56.5	18.2[3]	0.44
Red raspberry juice	3.18	0.30	3.05	9.0	2000	2121 60g. glycerine	56.5	18.8	0.45
Strawberry puree	3.22	0.30	3.05	8.0	2000	2224	56.5	19.0	0.45
Strawberry juice	3.40	0.70	3.02	9.0	2000	2100	56.5	19.6	0.48
Santa Rosa plum puree	3.00	0.00	3.00	11.0	2000	2090	56.5	18.4	0.45
Youngberry	3.15	0.30	3.02	10.7	2000	2100	56.5	18.2	0.45

[1]On basis of puree or juice.
[2]Rapid-set citrus pectin grade 185.
[3]Grade 202.

Company, San Francisco. Storage at +7 deg. F. was unsatisfactory for all of the gels. Granulation and syneresis were apparent after only two weeks of storage, and increased to an objectionable degree for some of the gels in six weeks. These effects probably are related to the fact that +7 deg. F. is near the freezing point of these gels.

There was practically no syneresis or granulation of any of the gels stored at +15 deg. F., even after seven months, but flavor loss was detectable, as compared with the –30 deg. F. samples after six weeks and was quite serious after three months. The gel strength of all samples increased with storage at +15 deg. F.

Currant-juice gel showed a greater tendency to become grainy than the other gels at all temperatures. It showed slight granulation after 4½ months, even at the lowest storage temperatures, –10 deg. F. and –30 deg. F., and excessive granulation after three months at 0 deg. F. The other gels probably would be considered first grade after 4½ months at 0 deg. F. or seven months at –10 deg. F. and –30 deg. F., although granulation could be detected under these storage conditions.

Syneresis of all of the gels stored at 0 deg. F., –10 deg. F. and –30 deg. F. was considered entirely satisfactory at all storage periods. Loss of flavor was detectable for samples stored for seven months at 0 deg. F. as compared with those stored at –30 deg. F. for the same storage period, but the flavor was still very good. No change of flavor from the beginning of storage through the seven months' period was observed for those samples that were stored at –10 deg. F. and –30 deg. F.

TABLE II—Composition of Gels of Storage Series.

Fruit	pH of gel	Composition of gel: Soluble solids, percent	Added pectin, percent	Glycerine, percent
Boysenberry puree	3.12	57.5	0.54	1.35
Loganberry juice	3.10	57.2	0.54	1.34
Currant juice	3.09	56.8	0.57	1.41
Raspberry juice	3.12	57.0	0.54	1.35
Raspberry puree	2.99	57.0	0.54	1.36
Strawberry juice	3.12	56.8	0.54	1.34

Preparing Gels from Purees

Cold-processed fruit gels were prepared from the following frozen fruit purees, which had been prepared with no special prefreezing treatment: Boysenberry, blackberry, red and black currant, guava, loganberry, red raspberry, strawberry, and youngberry. Purees were made by running sorted and washed fruit through a screw expeller type of pulper, with 0.026 to 0.033-inch sieve, to remove seeds and coarser fibrous material. The purees without added sugar were packaged in one gallon glass jars (only partially filled to avoid breakage) and immediately frozen in an air blast freezer at –10 deg. F. They were stored at this temperature until ready to be used.

Some fruits required special prefreezing treatments in the preparation of the puree or juice for this product. Fruits having active oxidative enzymes—for example, Santa Rosa plums—require a short heat treatment, such as flash heating, to inactivate the enzymes, or the addition of an antioxidant, such as ascorbic acid. Santa Rosa plum puree which had been treated with 100 mg. of ascorbic acid per 100 g. of puree at the time of processing gave a gelled fruit product of superior flavor in comparison with that flash heated to a maximum of 194 deg. F. for about 20 seconds. Concord grapes required a short heat treatment (hot-break, such as a one-minute steam blanch) before puree or juice preparation for extraction of color and inactivation of enzymes, which can cause discoloration and off-flavors.

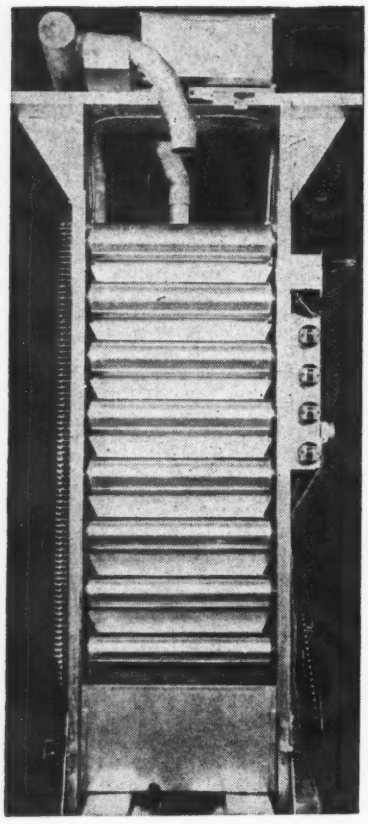
Gels Prepared from Juices

Gels were prepared from clarified juices of several of these fruits by removing the pulp from the defrosted purees. Red and black currant juices were much more attractive in appearance and gave gels superior to those from the purees. The latter lacked homogeneity when prepared as described. Homogenization would undoubtedly improve the appearance of these particular purees. The cold-processed gels made from clear juices differ considerably in texture and appearance from those prepared from purees. Juices yield highly elastic gels, whereas the puree gels possess less resistance to shearing force and hence do not have this high degree of resilience. The gelled puree product, however, usually carries more of the fullness of the natural flavor, although it does not have the eye appeal of the juice product.

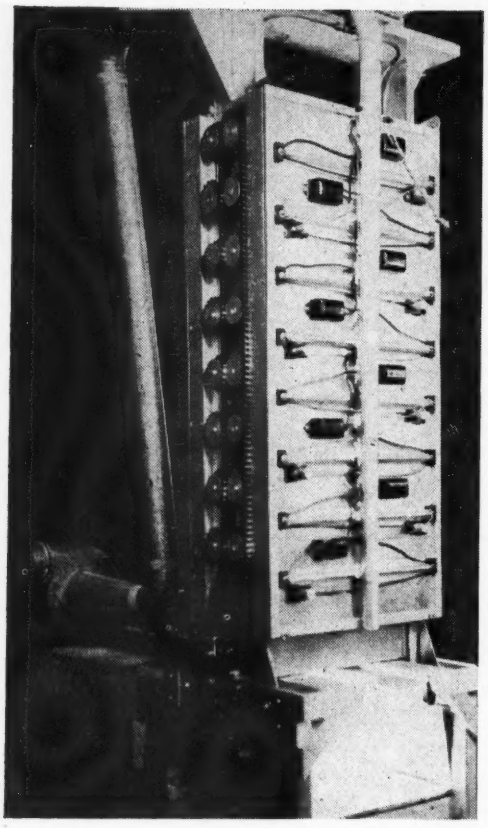
Vitamin C Retention

Limited data indicate good ascorbic acid retention in fruit purees or juices when made into cold-processed gels and stored at freezing temperatures. This is especially true in the case of the more stable fruits, such as berries, guava, and red and black currants. Over 90 percent ascorbic acid retention was observed in red raspberry and guava gels during preparation,

(*Continued on page* 201)



CYLINDERS, arranged in pairs, are rotated away from one another.



GERMICIDAL LAMPS are mounted on hinged panels that can be swung out for cleaning.

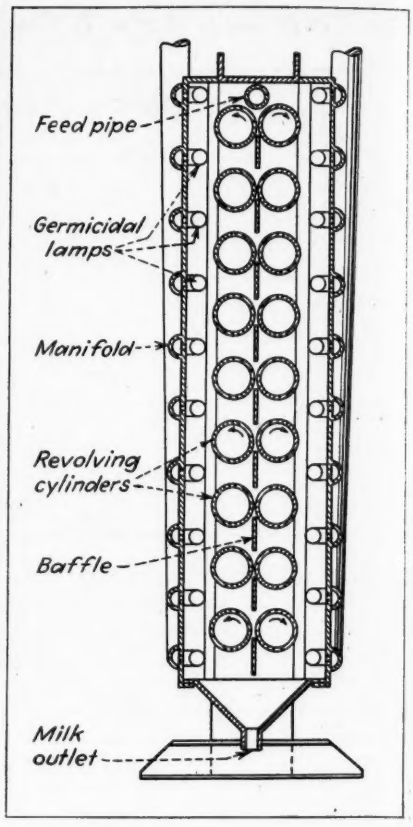


DIAGRAM of unit shows location of feed pipe, cylinders, baffles and lamps.

Pasteurizing With Ultraviolet

Germicidal lamps pasteurize milk without heat in newly developed

By EMMETT NICHOLSON, Chief Engineer,

A METHOD of pasteurizing milk with ultraviolet rays has long been attempted. Due, however, to the inability of these rays to penetrate an opaque liquid, the milk had to be reduced to a very thin film in order to obtain a satisfactory reduction in bacterial count. Working under this limitation, an apparatus with reasonable capacity would be very large and bulky, and present an enormous cleaning job after each run.

Prior to the war, all efforts to overcome these objections were fruitless. I was able to kill 99.8 percent of all bacteria found in milk with General Electric germicidal lamps, but the average output per lamp was less than 3 gal. per hr.

In this earlier work I used a lamp mounted in the center of a metal cylinder. This meant that every lamp had to be removed for cleaning and would have resulted in high loss through breakage in a commercial installation.

New Approach

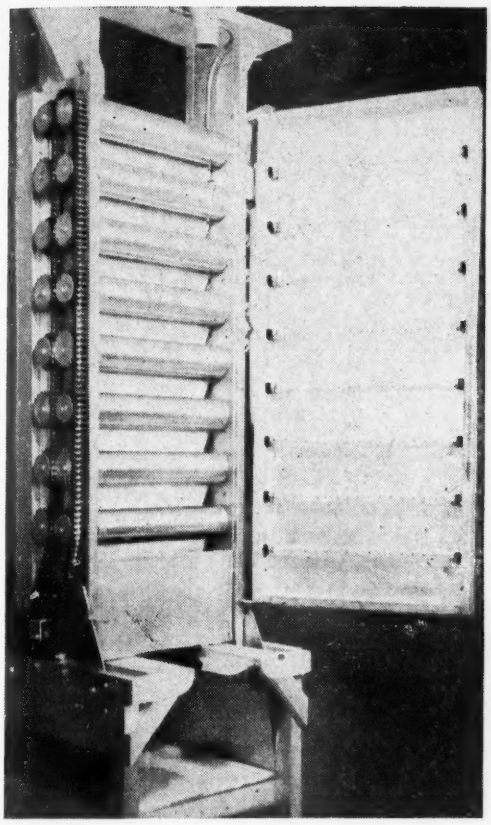
In the fall of 1946, after a stoppage due to the war, I again attacked the problem. To overcome lamp breakage I changed the milk flow from the inside to the outside of the cylinders. From here on I began to make progress with the result that I now have developed an apparatus capable of producing milk with less than 2,500 bacteria per c.c.

This looks like a promising approach to a problem that has heretofore defied many investigators. In this article, the inventor describes his experimental machine and summarizes the patent applications. In addition to the pasteurization of milk the equipment should be valuable for sterilizing water and fruit juices. —The Editors.

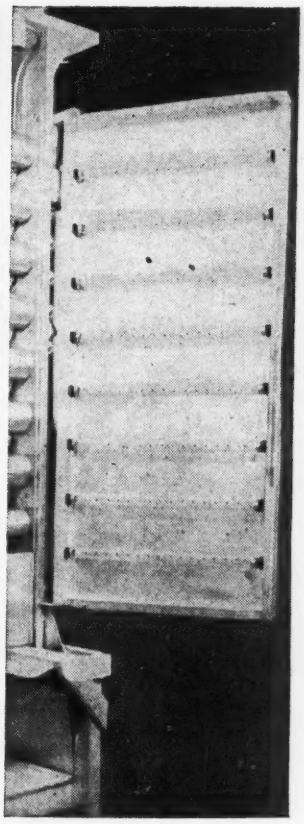
With the apparatus illustrated, a 1/64 in. film of milk flows over the cylinders, not by gravity but by the rotation of the cylinders. Cylinders are arranged in pairs rotating away from one another. Milk is fed into the space between the cylinders and is carried over and around by their rotation. A baffle removes the milk at the under side of the contact point of the cylinders.

Speed of cylinders is just sufficient to carry the milk past the point of gravity pull and up to the baffle. This action is carried on by each succeeding set of cylinders and the last baffle delivers the milk to the receiver from which the containers for shipment are filled.

As it passes over and around the cylinder, the milk tends to drag, and as the cylinder continues to pull, a certain amount of turbulence is created. This keeps changing the surface of the milk and exposes all



FRONT PANEL swung back to show the location of ultraviolet lamps. Chain drive is visible on left.



LAMPS turned on. This is how the front panel appears.

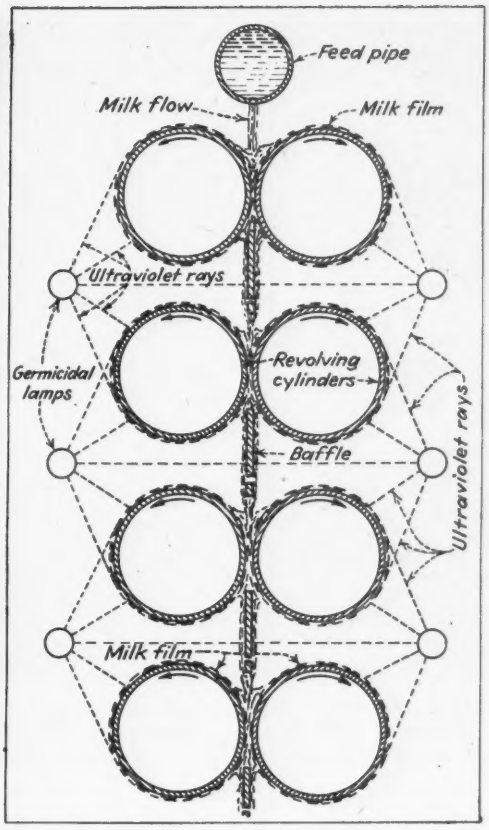


DIAGRAM shows how milk, carried as a film on the revolving cylinders, is exposed to the U. V.

Gives Low Bacteria Count Milk

apparatus. Special attachment permits water cooling during the operation

Juice Industries Inc., Dunedin, Fla.

of it to the lethal ultra-violet rays.

Thickness of the film is controlled by the rate of delivery of milk to the top pair of cylinders. Regardless of the thickness of the film (whether a few thousandths or over 1/16 in.) the milk is spread evenly over the surface of the cylinders. In fact, the only time a ripple or slug is evident is when the cylinder is touched by the finger, which we have often done to check the uniformity of the spread.

Manifolds, with branch lines behind each lamp, are connected to an exhaust fan. When sterilizing liquids other than milk, that are affected by ozone, the fan is operated to remove the ozone generated by the U. V. radiation. When these manifolds are used, the incoming air is passed through a suitable sterilizing filter.

Side panels, that support the germicidal lamps, are hinged so that they can be swung to one side for cleaning of the cylinders and lamps. Lamps are not removed, but are cleaned in place.

Use on Dairy Farm

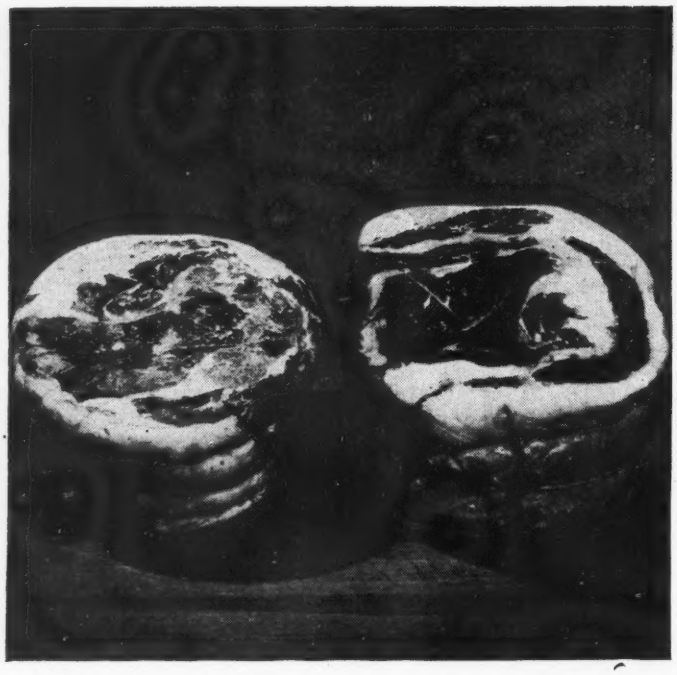
The unit is well adapted to use on a dairy farm. In preparing it for operation there are no great details to follow. The operator, or farmer, feeds several gallons of water through the machine to remove lint and dust from the cylinders. He then turns on the switch which lights the germicidal lamps, starts the motor and begins to milk the cows. By the time the first milk is received the unit is ready for the run.

The unit designed for the dairy farmer has a strainer above the sterilizer. Milk from the milking pail is poured through the strainer and flows by gravity into the sterilizer feed which is set for correct flow to the first set of cylinders. After passing through the apparatus, the milk enters a receiving tank and is drawn off into containers for delivery. Receiving tank and container are protected by germicidal lamps and by a suitable enclosure to keep out airborne bacteria.

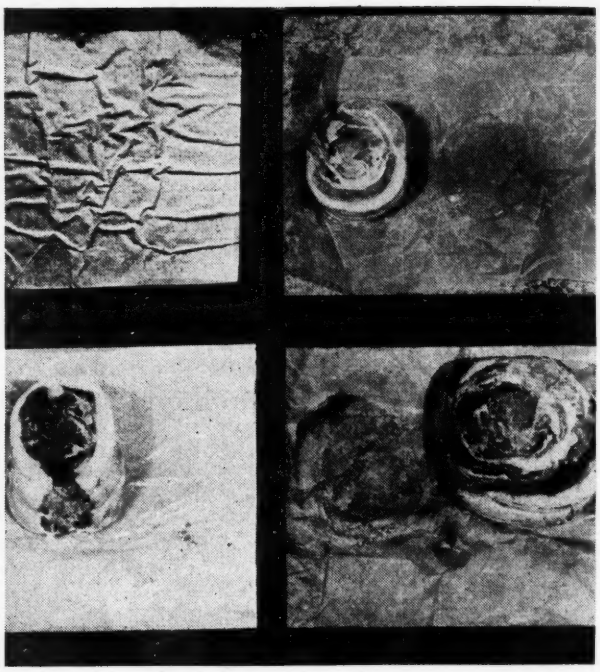
Special equipment can be supplied for feeding cooling water in and through the rotating cylinders. When this is used the milk is cooled as it is sterilized.

For the farmer who previously pasteurized his own milk, installation of this unit means the elimination of the old type pasteurizer, boiler and cooling coils. The new unit should cost less than the three items mentioned above. If desired, a completely sterile product may be obtained, but with a large reduction in capacity.

(*Continued on page* 204)



GOOD AND POOR packaging. Poorly wrapped roast (left) is badly dehydrated, while properly wrapped roast (right) maintains its quality. Use a good grade of wrapper, adequately applied.



MEAT QUALITY is influenced by wrappers. Delaminated wrapper loses moisture-vapor permeability (top, left). Results of good (bottom, left) and poor packaging (top and bottom, right).

How Wrappers Influence

Good wrappers, properly applied, are necessary to maintain quality. Boning

By D. C. McCOY, Frigidaire Division.

At least 50 percent of the successful production of quality frozen foods lies in the use of proper wrapping materials and proper application of these materials to the product. Especially is this true in the case of frozen meats. Many complaints of poor quality have been directly traced to poor wrapping materials, improper application of good materials, or a combination of both.

Why is it important to package and wrap? There are three major reasons:

1. To maintain quality.
2. To maintain sanitary conditions.
3. To assure convenience.

Maintaining Quality

Quality is maintained by minimizing product dehydration, oxidation and other changes with the use of a good moisture-vaporproof wrapper. The fat in meat cuts becomes rancid when in contact with oxygen in the air. Oxidation and subsequent rancidity can be reduced to a minimum by good barrier wrappers that prevent oxygen from the surrounding air from getting into the package. A good wrapper will also retain the flavor of the product and keep foreign odors out of the package.

Frozen meats, wrapped in poor wrapping material using the improper butcher style wrap, become badly dehydrated. If stored for a sufficiently long period of time, the quality of the meats will also deteriorate greatly. On the other hand, frozen meats wrapped in a good material, properly applied by means of the drug store style wrap, will show no objectionable change in appearance and quality.

Not only is it necessary to use good material and the proper style of wrapping, but the wrapper must also be applied so that it will cling to the surface of the meat, without the presence of air pockets. Air trapped between the meat and barrier will accelerate oxidation and rancidity. Even though a material may be a good moisture-vapor barrier, the meat will lose moisture if the wrapper is loosely applied. Moisture will deposit on the surface of the meat in the form of ice crystals and the surface below will become dehydrated. While such dehydration is usually only "skin deep," the appearance of the product suffers.

Wrapping Boned Meats

Recent work completed by L. J. Bratzler, Dept. of Animal Husbandry, Michigan State College, has settled some questions raised about boning beef. It has been commonly believed that bones should be left in beef to obtain maximum flavor and juiciness of the cooked meat. Tests have shown, however, that the removal of bones from meat has no effect upon the flavor or juiciness of cooked meats.

Further tests with choice, good and commercial grades of beef, which were boned, wrapped, frozen

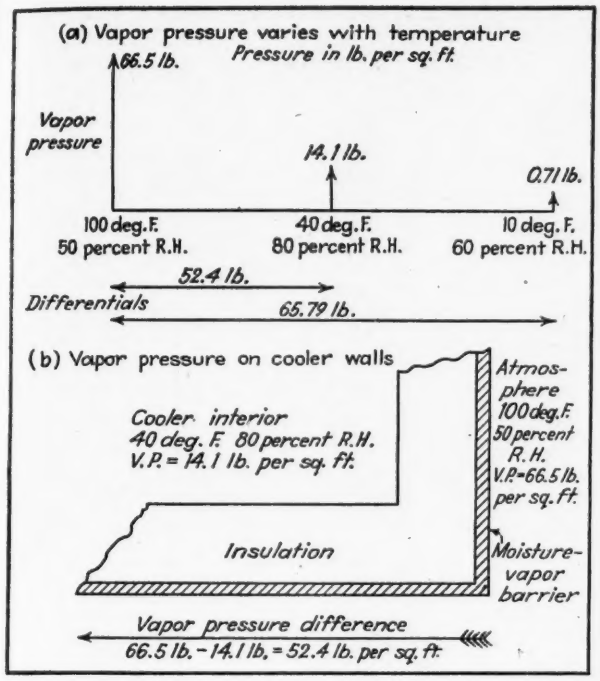

(a) Vapor pressure varies with temperature
Pressure in lb. per sq. ft.
66.5 lb.
Vapor pressure
14.1 lb.
0.71 lb.
100 deg. F. 50 percent R.H.
40 deg. F. 80 percent R.H.
10 deg. F. 60 percent R.H.
52.4 lb.
Differentials
65.79 lb.
(b) Vapor pressure on cooler walls
Cooler interior 40 deg. F. 80 percent R.H. V.P. = 14.1 lb. per sq. ft.
Atmosphere 100 deg. F. 50 percent R.H. V.P. = 66.5 lb. per sq. ft.
Insulation
Moisture-vapor barrier
Vapor pressure difference
66.5 lb. - 14.1 lb. = 52.4 lb. per sq. ft.

FIG. 1. Vapor pressure control is important to handlers and users of frozen foods because of food preservation and protection of insulation in refrigerated rooms.

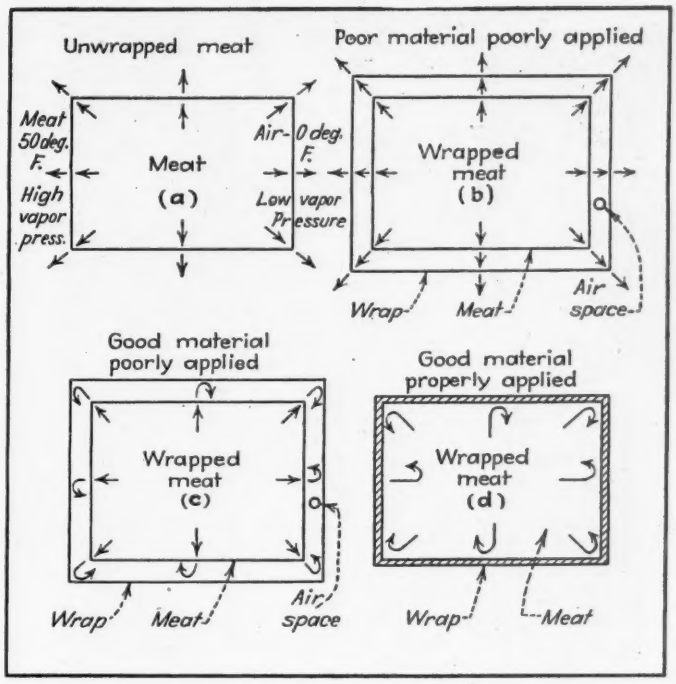


FIG. 2. Right and wrong application of packaging materials to frozen meats with good and poor moisture-vapor barriers. Vapor pressure created causes the moisture in the meat to migrate from the meat.

Quality of Frozen Meats

reduces storage space, damage to wrappers, and the cost of meat packaging

General Motors Corp., Dayton, Ohio

and stored, showed 30 to 35 percent storage space savings due to the removal of bones.

Boning permits a better wrapping job. It also reduces damage to wrappers, resulting in less dehydration and loss in quality than occur in bone-punctured wrappers. It is also reasonable to assume that less wrapping materials are required for boned than bone-in meats.

Sanitation and Convenience

Frozen foods receive a certain amount of handling during freezing and subsequent storage. If they are not properly packaged, contamination results. Use of proper packages also prevents leakage of fruit sirups, vegetable juices and meat juices.

For the purpose of convenience, frozen foods must be packaged in quantities suitable for family serving. Frozen foods stored in low temperature warehouses, lockers or home freezers will not freeze together in a solid piece if proper packaging materials and technics are used. In addition, use of the proper type of packages allows for more efficient use of storage space.

Importance of Water-Vapor

To better understand why and how changes in the quality of frozen meats take place and to emphasize the importance of using good moisture-vapor barrier materials, let us examine a few fundamentals.

Water in the form of ice will change from the solid to the vapor state without passing through the liquid state. It is this characteristic of water in frozen foods which makes it necessary to use a moisture-vapor barrier for a wrapper.

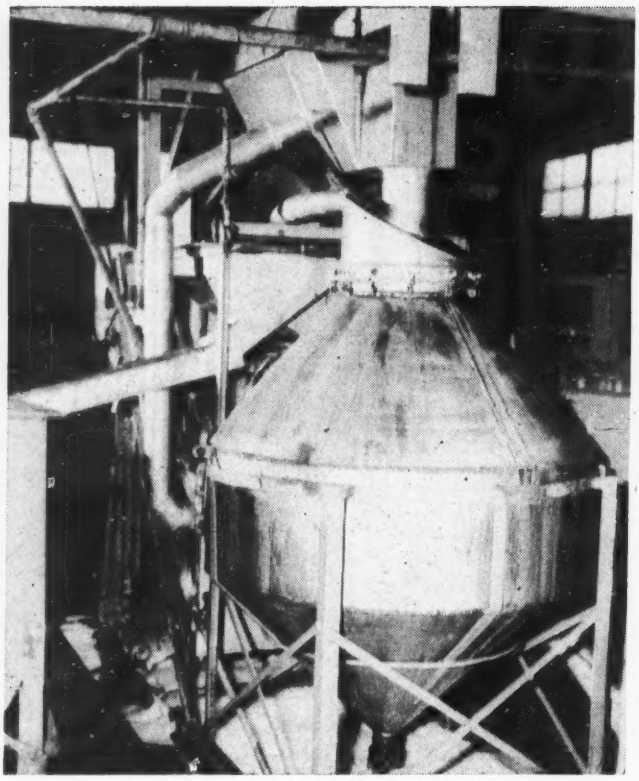
Water-vapor exerts a definite pressure which varies with temperature as shown in Fig. 1(a). This is important to handlers and users of frozen foods for two reasons: (1) Proper preservation of foods and (2) protection of insulation in refrigerated rooms and fixtures.

By subtracting the vapor pressure of water at 10 deg. F. and 60 percent relative humidity (0.71 lb. per sq. ft.) from the vapor pressure at 100 deg. F. and 50 percent relative humidity (66.5 lb. per sq. ft.) in Fig. 1(a), a 65.79 lb. per sq. ft. differential in pressure is obtained. If this difference in pressure exists, for example, between a piece of meat and the atmosphere in which it is frozen, moisture-vapor will be transferred from the meat to the surrounding atmosphere. Since this moisture cannot be replaced, meat so handled is freezer burned (dehydrated) and unattractive in appearance.

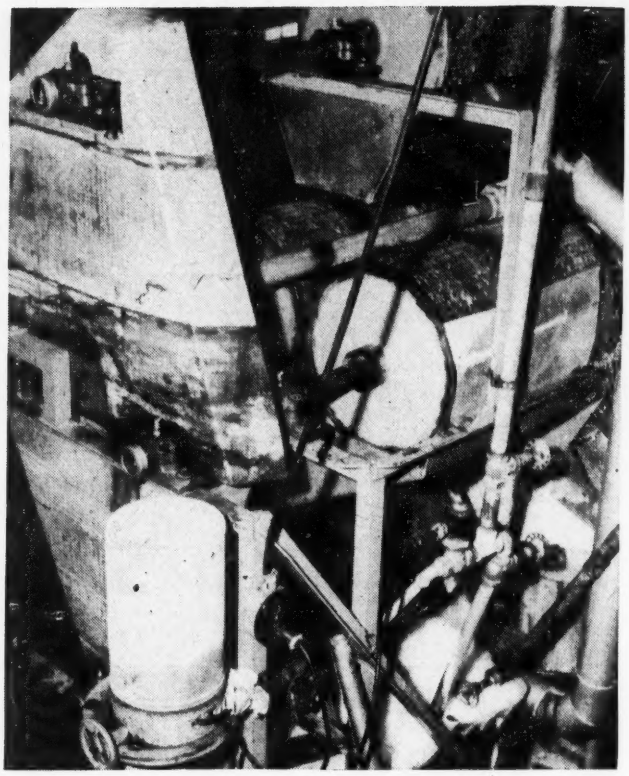
Water-Vapor Pressure and Refrigerator Room Insulation

The section of a cooler in Fig. 1(b) illustrates vapor pressure difference exerted on the walls of a cooler kept at 40 deg. F. and 80

(*Continued on page* 202)



KEY QUALITY GRADER: Peas and brine are mixed in hopper at top and flow through large pipe into separation tank below.



DEWATERING REELS: Top reel receives peas from flume and dewaters them. Reels below separate graded peas from brine.

Improved Quality Separator

Peas and brine enter at center of top-shaped separation tank. Tender peas float out overflow port, mature ones are removed from bottom by brine jet

By C. R. HAVIGHORST, Associate Editor, "Food Industries," San Francisco, Calif.

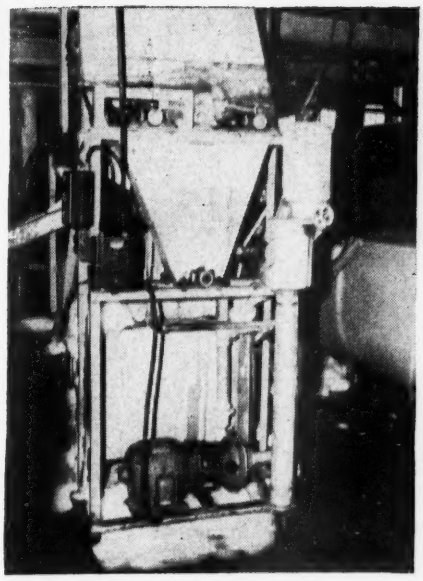
FOR more than 30 years it has been known that young, tender peas of best quality have a lower specific gravity or density than the more mature, harder peas of lower quality. As long ago as 1919 one company was taking advantage of this knowledge and making a crude commercial quality separation by continuously pouring peas into a brine of suitable density, then skimming off those that floated. The sinkers were then removed from the brine, both sinkers and floaters were washed in clear water and canned separately.

Since this time, there have been a number of quality graders put on the market, and while they all operate on the original principle of gravity separation, they all evidence differences in function and design. All, however, are designed for operation on a continuous line, although in handling capacity there is a variance as to the tonnage each grader can handle.

In order to accomplish a true quality separation by this method, peas must be introduced into the brine in such a manner that their entry will not create currents. The brine and peas must remain as quiescent as possible for a few seconds so that the force of gravity may effect the desired separation. Interference by forces such as unusually strong currents developed by entry of the product into the brine tank, can impair separation.

In the case of the Key Quality Grader, described in this article, the blanched peas enter as in the case of other graders. The peas are first cooled, by fluming through cold water; then they are dewatered in a reel. There is a difference, however, in the actual introduction of the product into the separation tank. In the case of the Key grader, peas from the dewatering reel are dropped into the hopper, where they are mixed with the recirculating brine. Peas and brine then flow down the outside pipe of the double conductor pipe, to the center of the separation tank. Both peas and brine flow uniformly from this opening, creating little turbulence within the tank. The tender peas rise to the upper apex of the conical shaped tank and through an overflow port into a dewatering reel. The sinkers move to the lower apex of the tank and are given a slight boost by brine (entering through a jet valve at 5 lb. pressure), so that they rise through the center of the double conductor pipe to a port at the top of the tank where they discharge into a dewatering reel.

Brine density, controlled automatically through Sal-Wood equipment, is maintained at a point



RECIRCULATING PUMP for brine (below) and Sal-Wood Brine control unit (left).

PORTHOLE in separation tank. Peas are clearly discernible as they rise or sink.

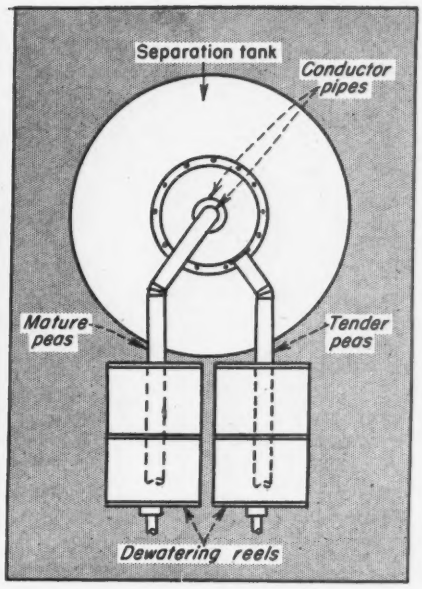
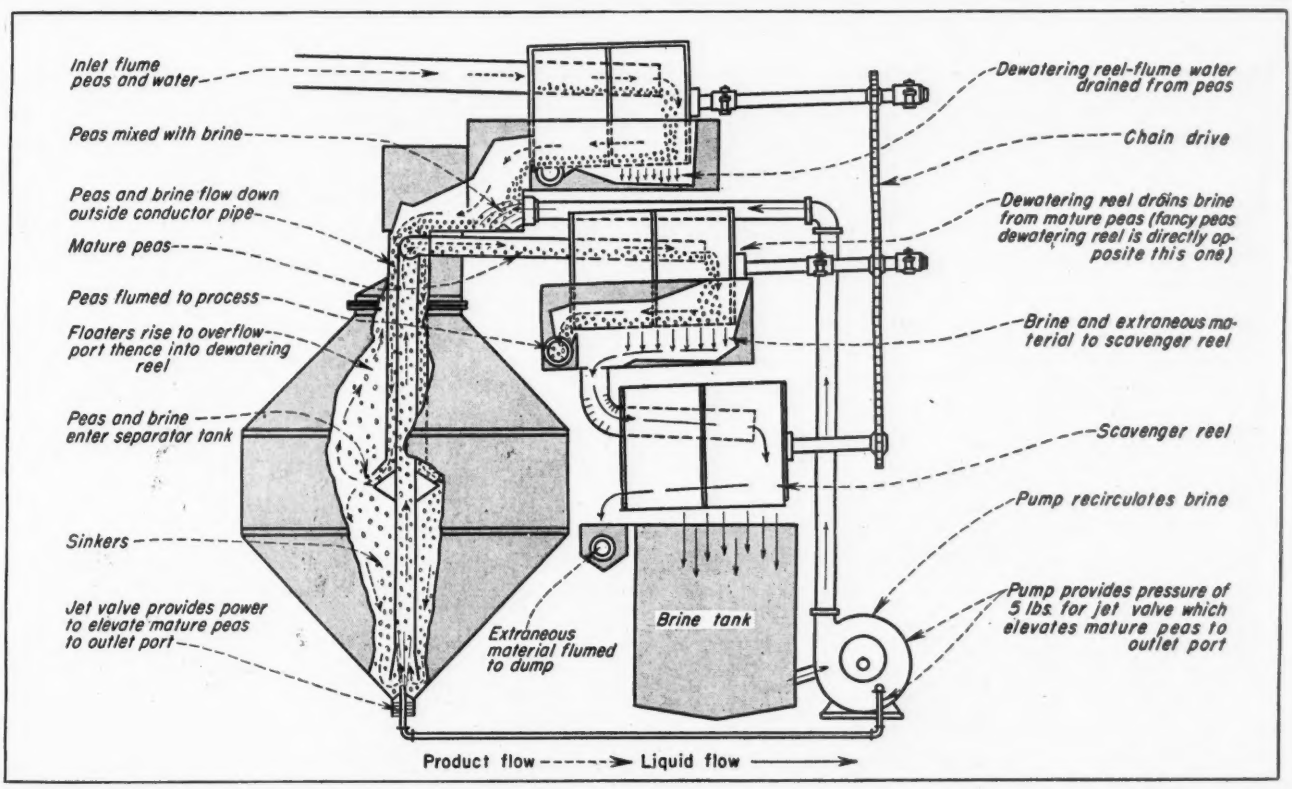


DIAGRAM shows location of dewatering reels for separation of peas from brine.


Inlet flume peas and water
Peas mixed with brine
Peas and brine flow down outside conductor pipe
Mature peas
Peas flumed to process
Floaters rise to overflow port thence into dewatering reel
Peas and brine enter separator tank
Sinkers
Jet valve provides power to elevate mature peas to outlet port
Extraneous material flumed to dump
Brine tank
Dewatering reel-flume water drained from peas
Chain drive
Dewatering reel drains brine from mature peas (fancy peas dewatering reel is directly opposite this one)
Brine and extraneous material to scavenger reel
Scavenger reel
Pump recirculates brine
Pump provides pressure of 5 lbs. for jet valve which elevates mature peas to outlet port
Product flow
Liquid flow

FLOW DIAGRAM of Key Quality Grader shows how peas are mixed with brine and carried down center of separation tank. Tender peas float and pass through overflow port to dewaterer. Mature peas sink and are discharged through conductor pipe to dewaterer.

slightly higher than that used with other quality graders, at around 10 to 12 percent. A temperature of 70 to 80 deg. F. is recommended for brine used in this grader.

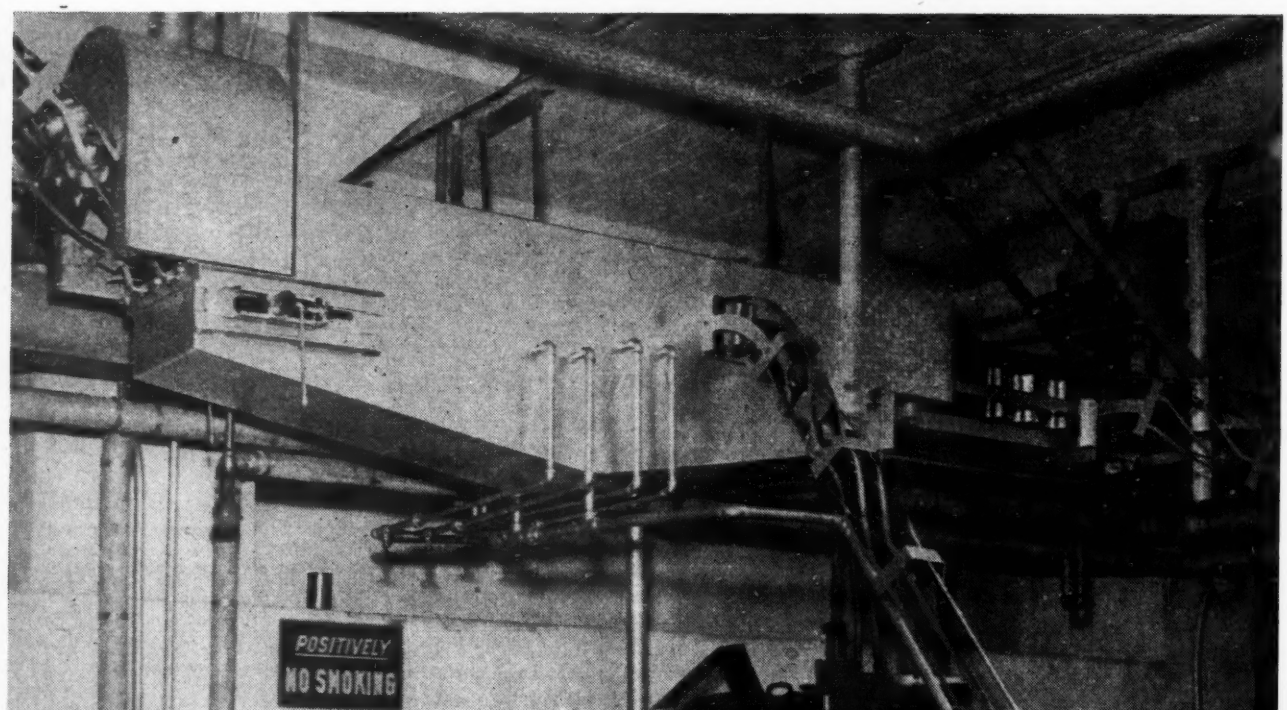
The separation tank, shaped like a top, has a capacity of 250 gal. A glass porthole is located at the center and on one side of this tank, through which the operator may inspect the inside of the tank.

The brine which floats both grades of peas from the separator tank is separated from the peas at the two dewatering reels. It then flows through a scavenger reel, which separates any extraneous material from it, and is then recirculated through the system.

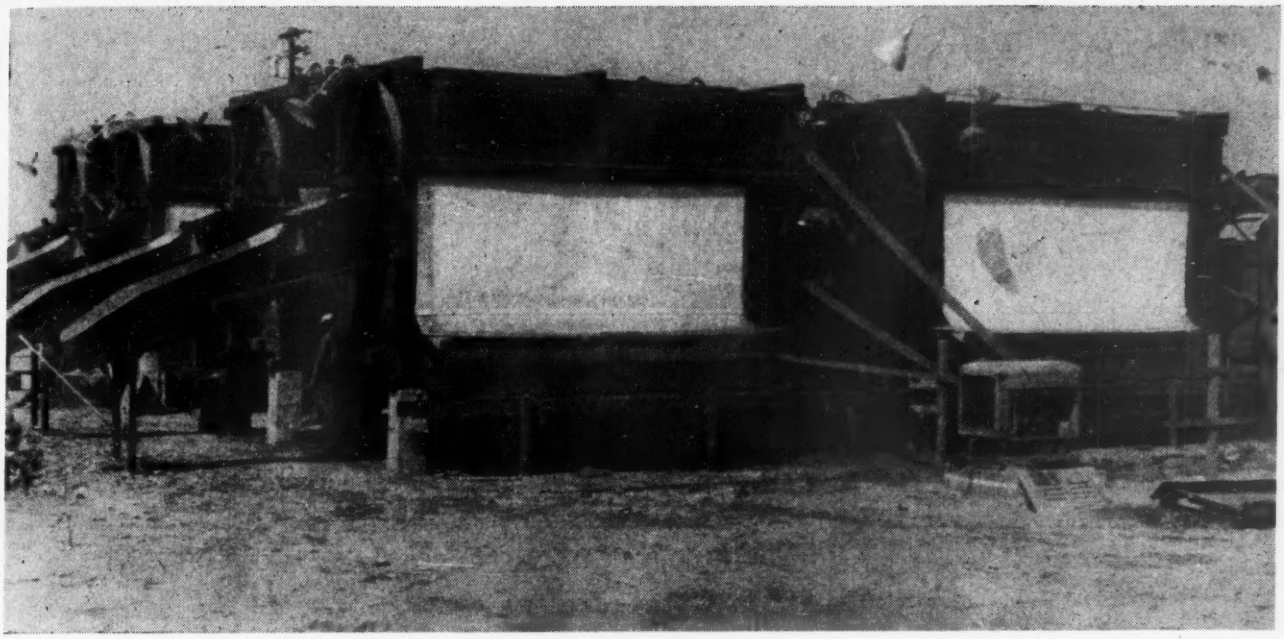
All four dewatering reels are mounted on a butt-end axle. Peas are flumed to the back, or blind end of each reel and as they are dewatered, move to the open ends. One ¾ hp. gear head motor powers all four reels and the brine pump through means of an endless chain.

The Key Quality Grader has a capacity of 3 to 5 tons of peas per hour, weighs approximately 1,750 lb., and its total dimensions are 8 ft. 2½ in. long, 8 ft. 6 in. high and 4 ft. 4 in. wide. Inventor and present manufacturer is Mr. Claude Key, manager of The Umatilla Canning Co., of Milton, Oregon.

PORTABLE BEAN CLEANING equipment at work in the field. Such mechanical methods aid in quality control. This equipment is loaned to contract growers. Grower contracts are strict, requiring that produce exceed the quality of customary market standards.



EMPTY CANS for orange juice (upper left) are being delivered to the steam sterilizing chamber in which they are completely sterilized by use of live steam. Cans then travel down chute (right) to can-filling machine. The small machine at the bottom is a vacuum-closing apparatus for sample cans. A graduate chemist is in charge of controlling the quality of orange juice. Control tests are continuously made on the sugar, acid, vitamin C and pulp contents. Checks are also made on the color, flavor and net weight contents.



BEAN VINER does work of a corps of persons. It removes beans from pods. Freshly podded beans are then rushed to the plant where they are immediately quick frozen. Field supervision begins with growing of seed, ends when produce is delivered to plant.

Field-To-Consumer Control Assures Quality Frozen Foods

Quality products are produced by field, plant, laboratory and government control. Crop supervision insures quality vegetables and increases crop yields. It covers irrigation, planting technics and elimination of pests

By E. E. TODD, Director of Research and Quality Control
California Consumers Corporation, Pasadena, Calif.

A SURVEY of business failures in the food industry would undoubtedly show that many are due to lack of controls which insure quality products reaching consumer.

Field-to-consumer control of frozen foods at the California Consumers Corp., Pasadena, Calif., is maintained by a four-way field, plant, laboratory and government control, shown diagrammatically in the quality control chart. With some exceptions, the field department controls seed selection, planting, cultivation and harvesting. Plant crews inspect raw material for defects and extraneous matter. Routine checks are made by the laboratory to determine the effectiveness of treatments before a USDA inspector makes a final quality check.

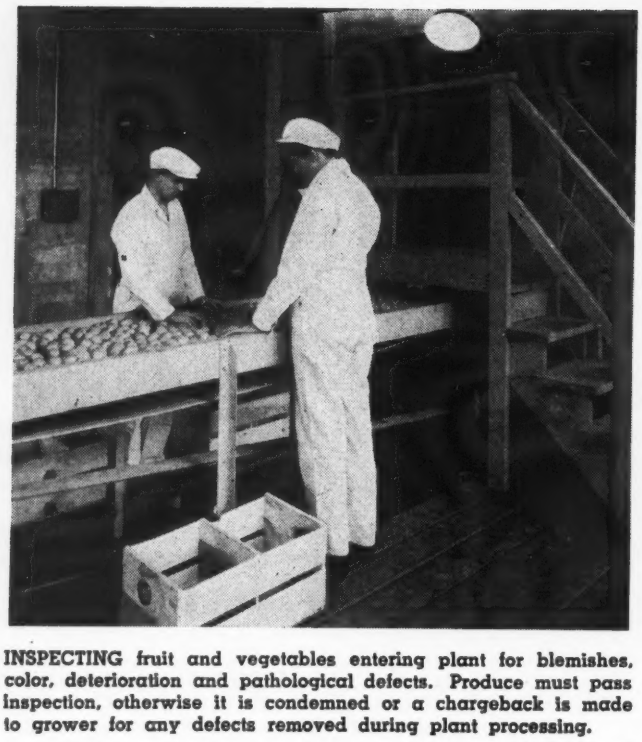
Before California Consumers Corp. began to manufacture frozen foods, extensive laboratory research work was undertaken for several years. Consequently, when plant production was started, it was logical for the laboratory to supervise processing. The present quality control has grown from this initial work.

The 12-month growing season in Southern California enables the field department to select periods for each pack. The best quality and quantity of fruits and vegetables can be selected to enable continuous plant operation. Yearly production schedule is approximately:

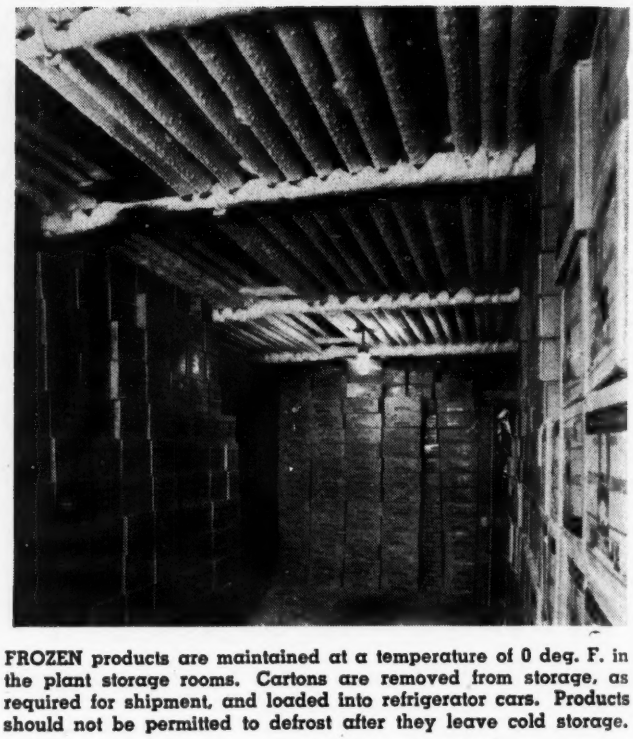
Jan. 1 to Mar. 5—broccoli
Mar. 1 to May 1—spinach
May 1 to June 1—rhubarb
June 1 to July 15—green beans
July 1 to Aug. 1—apricots
July 1 to Oct. 30—orange juice
Aug. 1 to Oct. 1—Fordhook lima beans
Sept. 15 to Jan. 1—Brussels sprouts
Nov. 15 to Feb. 1—Snowball cauliflower

With the exception of oranges and apricots, strict control is exercised by the field department from the growing of seed through planting, cultivation and final harvesting. In the case of fruit, its acceptance depends upon application of existing standards of quality.

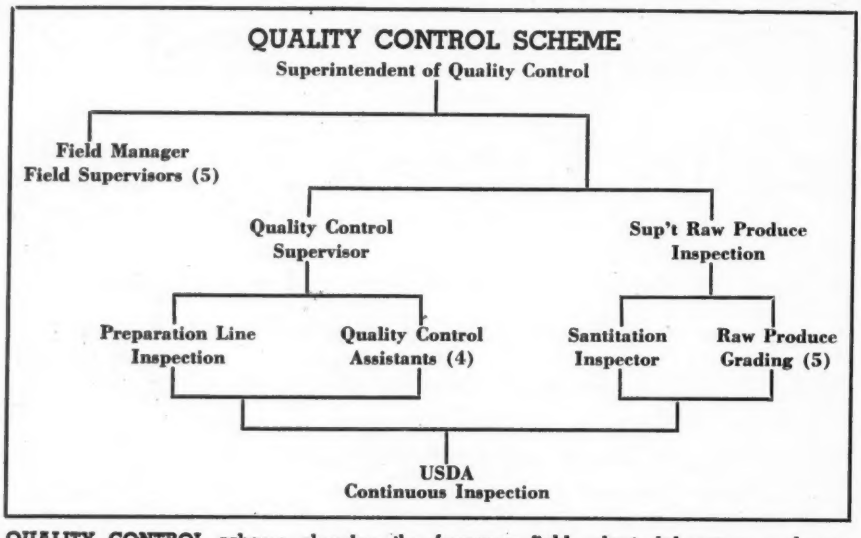
Seeds, such as broccoli and Fordhook lima beans, are grown in selected districts which are free of disease and yield the hardiest plants. During growth all undesirable plants are carefully removed to obtain the purest strains possible. Seeds are meticulously harvested, screened and winnowed. Such lots are labeled and germination tests are made by the laboratory.



INSPECTING fruit and vegetables entering plant for blemishes, color, deterioration and pathological defects. Produce must pass inspection, otherwise it is condemned or a chargeback is made to grower for any defects removed during plant processing.



FROZEN products are maintained at a temperature of 0 deg. F. in the plant storage rooms. Cartons are removed from storage, as required for shipment, and loaded into refrigerator cars. Products should not be permitted to defrost after they leave cold storage.



QUALITY CONTROL scheme showing the four-way field, plant, laboratory and government control of frozen foods at the California Consumers Corp., Pasadena, Calif.

California Consumers Corporation
Daily Sanitation Report
Citrus Juice Plant

Date.....

1	Bins		10	Reamers	
2	Elevator		11	Finishers	
3	Conveyor		12	Surge tank	
4	Inspection belt		13	Holding tanks	
5	Wash tank		14	Fillers	
6	Scrubbers		15	Peel bin	
7	Driers		16	Floor	
8	Elevator		17	Walls and ceiling	
9	Conveyor		18	Drains	
			19	Peel bin outlet	

Remarks:

Form No. M-200 A
3/26/46

Signed .....

SANITATION report sheet used daily in the citrus juice plant. Inspections are made each morning before processing begins on the condition of the floors and equipment.

By careful compilation of crop yields and quality data for the past 10 years it has been possible to select growers with proper soil requisites for each crop. Hence, with close supervision of each crop, it has been possible to increase yields and improve quality. Crop supervision covers planting time and technics, fertilization, irrigation and pest prevention.

This has worked out in the case of spinach, where proper land cultivation, careful irrigating and dusting before pest invasion have enabled the production of weed-free, clean spinach of unusual size with per acre yield increased 35 percent. Broccoli has likewise responded to supervision with yields often more than four times the average.

Grower Contracts

The 6,500 acres under company supervision are owned by about 90 growers located in three agricultural areas in Ventura, Los Angeles and Orange counties. This territory is about 130 miles long and usually less than 10 miles from the ocean.

Grower contracts are strict, requiring that produce considerably exceed the quality of customary market standards. Absence of disease and infestation is stressed. The grower is assured a set price, competent supervisory control and the use of company-owned equipment, such as dusting, harvesting and cutting machines. A fleet of 15 trucks with trailers assures prompt deliveries to plant.

Because of planned planting in different locations, the maturing of crops occurs over a period of several weeks, with consequent elimination of production peaks and concomitant defection in quality. The quality of harvested crops is maintained by procedures developed especially for each product. Spinach is always cut from 2 a.m. to 4 a.m. while it is cold and crisp. It is then hauled in bulk to the plant where it is immediately processed. By using this practice, spinach never becomes wilted or overheated. Spinach is usually run through the plant and sealed in packages within three or four hours after cutting. Spinach is never held overnight.

Lima beans are shelled in the field and quickly packed in a steel bin with ice. About six inches of ice is packed in the bottom of each steel bin, followed by layers of beans and crushed ice, and a final 6-in. blanket of ice on top. Beans arrive at the plant fully protected with ice until they are processed. In this manner souring is eliminated, quality insured and losses reduced. Other vegetables such as broccoli and cauliflower are never permitted to remain on dock while awaiting processing, but are always refrigerated to avoid wilting or overheating. Although the fieldmen reject all produce which they consider below quality, every load of each product undergoes inspection upon arrival at the plant. This is necessary to avoid processing sub-standard raw material.

Inspection at the Plant

A well-trained crew at the plant inspects samples for correct maturity, insect damage, infestation, pathological damage, oversize, undersize, color, appearance, toughness, extraneous material or any defect which affects quality standards. Produce which does not pass inspection is either condemned or a chargeback is made to the grower for defects which may be removed by plant processing. Serious defects are immediately called to the attention of the field department. In fairness to growers a daily report is issued to acquaint them with defects that can be culled out in the field, such as off-color, over-maturity, or poor trimming.

Because many defects can be eliminated on the preparation line, it is necessary to apply strict control with continuous inspection at this point. The volume flow of raw materials in this line is regulated by the quality produced.

Routine laboratory checks are made to determine the effectiveness of treatment prior to final inspection. Silt tests are conducted to determine the efficiency of washing. Catalase enzyme tests are used to determine the effectiveness of blanching. A large crew of women continuously inspects the cooled, blanched raw materials before they are packed. On these inspection belts, color defects, mechanical injury and all defects detrimental to grade are removed.

A quality control assistant continually checks net weight contents of packaged products and critically examines from 5 to 15 cartons per hour. Every unit in each package is counted and graded. All defects are recorded and a final USDA grade assigned. The quality control assistant keeps foremen and forewomen informed of the condition of the pack. Any lowering of quality results in an instantaneous slowing of plant operation. If any product which is unacceptable in quality has been packed before the situation is corrected, it is tagged on the trays and usually dumped.

NY 11002-B 4/44

Physical Quality Control Work Sheet

Snap Beans

Date .....

Carton size .....

Plant .....

Packed as ..... (Cut or frenched) ..... (Green or wax)

Code .....

	Sample No.	1	2	3	4	5	6	7	8	9	10	Summary
	Time											
	Packing line no.											
	Carton soiled											
	Poorly coded											
	Poorly folded											
	Poorly racked											
	Foreign material (designate)											
	Worms — large											
	Worms — small											
	Insects (designate)											
	% Pieces over 1¼ inches											
	% Variation in color											
	Harmless extraneous vegetable material											
	% Units with tough strings											
	% Unsnipped stem ends, snips											
Minor defects	% Blemished (rust)											
Minor defects	% Other											
Minor defects	Total											
Major defects	% Spotted											
Major defects	% Insect injury											
Major defects	% Other											
Major defects	Total											
Mechanical defects	% Small pieces											
Mechanical defects	% Splits											
Mechanical defects	% Ragged pieces											
Mechanical defects	Total											
												No. A's / No. B's / No. C's / No. D's
	Color grade											
	Defect grade											
	Texture grade											
	Final grade											

Unless otherwise indicated, all counts are per pound, or per smaller package.

..... Approved by

Grader: .....

TOUGH STRINGS, poor snipping, rust, spots, insect injury, splits and small and ragged pieces are important defects that inspectors must look for in snap beans.

Laboratory Control

A quality control aide also checks time of delivery of packaged goods to the freezer to insure against bacterial growth. In the case of orange juice, a graduate chemist is in charge of quality control. A well-equipped laboratory is located in the juice plant. Here continuous control tests are made on the sugar, acid, vitamin C and pulp contents,

California Consumers Corporation
Physical Quality Report — Spinach 194__

Sheet No. ..... Date .....
Shift ..... Code .....

	1	2	13	14	15	Summary
1. Time						
2. Actual weight						
3. Carton soiled						
4. Carton, poorly coded						
5. Carton, poorly folded						
6. Carton, poorly packed						
7. Amount moisture						
8. Temperature of product						
9. Yellow leaves						
10. Insect injury						
11. Underblanched leaves						
12. Overblanched leaves						
13. Leaves with moldy spots						
14. Yellow hearts						
15. Red stem ends						
16. Roots						
17. Weeds						
18. Other foreign material						
19. Large stems						
20.						

Remarks: Signed:

Form M-81

SOME IMPORTANT defects to watch for in spinach are yellow, mold-spotted, under- and over-blanched leaves and yellow hearts.

California Consumers Corporation
Physical Quality Report — Rhubarb 194__

Sheet No. ..... Date .....
Shift ..... Code .....

	1	12	13	14	15	Summary
1. Time						
2. Cartons/min. over line						
3. Actual weight						
4. Carton soiled						
5. Carton, poorly coded						
6. Carton, poorly folded						
7. Carton, poorly packed						
8. Amount moisture						
9. Growth cracks						
10. Diagonal cuts						
11. Diameter over 1¼ in.						
12. Field cut — root end						
13. Field cut — leaf end						
14. Leaves						
15. Dried blossoms						
16. Rust						
17. Other foreign matter						
18.						

Remarks: Signed:

Form M-140

LEAVES, dried blossoms, rust, growth cracks and diagonal cuts are some of the important defects that are found in rhubarb.

Physical Quality Control Report
Lima Beans

Form M-110
EET:LS

Plant .....
Date .....
Code .....

	1	2	13	14	15	Summary
Time						
Actual weight						
Carton soiled						
Poorly wrapped						
Poorly coded						
Poorly folded						
Poorly packed						
Excess moisture						
Foreign material						
% White						
Off-color						
Stones						
Pods						
Vines						
"Black" eyes						
Damaged or bruised						
Diseased						

Indicate "yes" by check mark (✓) when numbers are not called for:

Remarks: Signed:

LIMA BEANS are inspected for such important defects as off-color, pods, stones, vines, "black eyes" and percent white beans.

California Consumers Corporation — Physical Quality Report
Broccoli — Brussels Sprouts — Cauliflower

Code ..... Sheet No. .....
Date ..... Shift .....

	1	2	13	14	15	Summary
1. Time						
2. Cartons/min. over line						
3. Actual weight						
4. Carton, soiled						
5. Carton, poorly wrapped						
6. Carton, poorly coded						
7. Carton, poorly folded						
8. Carton, poorly packed						
9. Excess water						
10. Number per ctn.						
11. Off-color heads						
12. Mechanical damage						
13. Insect damage						
14. Insect infestation						
15. Loose head						
16. Blossomed head						
17.						
18.						
19.						
20. Defect of (below) workmanship						

A. Poorly trimmed D. Too short G.
B. Too large E. Too long H.
C. Too small F. J.

Indicate "Yes" by check mark (✓)
Underline product examined.

Form M-171

Remarks:

Signed:

INSPECTORS use the same physical quality control sheets for recording defects in broccoli, Brussels sprouts and cauliflower.

as well as checks on color, flavor and net weight contents.

Daily samples are collected by the main laboratory from all plants and checked for appearance, drainage after thawing and defects. Cooking tests are made for flavor and texture. Chemical and bacteriological tests are made on other samples.

Satisfactory quality cannot be maintained under unsanitary conditions. Consequently, quality control has also been made responsible for plant cleanliness. A sanitation inspection is made each morning before processing begins, and a report is issued on the condition of floors and all equipment. Every effort is made to facilitate plant cleanup by avoiding the use of wood in place of concrete, steel or rubber.

The night cleanup crew thoroughly cleanses and disinfects the plant. Cleanup men also keep the plant in order during the day to prevent the accumulation of refuse. Continuous germicidal washes are used on belts during production to prevent bacteria or mold build-up. Bacteria and mold counts conducted in the laboratory serve as a final indication of plant sanitary conditions. For example, a high bacterial count traced along the line can often reveal the presence of contamination likely to pass unnoticed.

Government Inspection

The plant is under continuous inspection of the U. S. Department of Agriculture. A final quality check is also made by the USDA inspector. The inspector issues a daily quality grade certificate for each product packaged and also a report on plant sanitation. This inspection is public assurance that the quality control system has functioned.

While it is difficult to assign any dollars and cents costs to quality control, or even arrive at a satisfactory percentage of total plant cost, meticulous quality control does pay for itself in the prevention of spoilage. Many variable items affect quality control. Consequently, it is impossible to make any hard and fast assignments on time and costs. Quality control is, however, one of the best investments that can be made. Such controls will become increasingly important in modern food processing.

There is another important asset to which quality control contributes and it should not pass unnoticed. This is the confidence and goodwill that accrue to an organization from high standard products.

Vegetable Packing Department
Quality Control

California Consumers Corporation — **Weight Sheet**

Product..... **Size**.....**Label**. .... **Date**.....

Shift..... Code.....

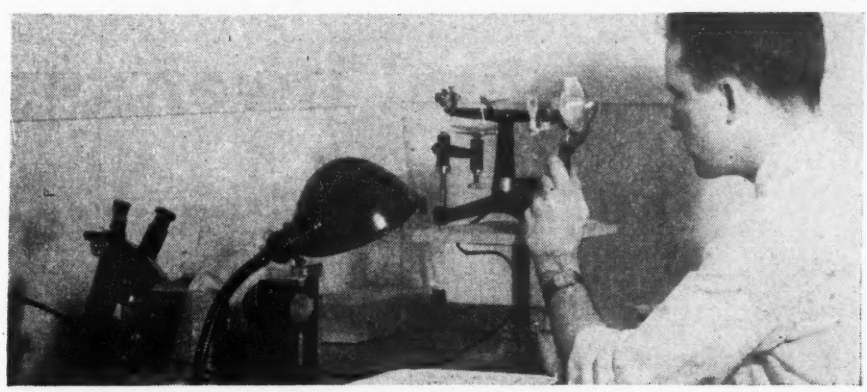
	Under ¾	⅝	½	⅜	¼	⅛	0	⅛	¼	⅜	½	⅝	¾	Over
Time ..... No. cartons examined	Total under				Total O.K.						Total over			
Time ..... No. cartons examined	Total under				Total O.K.						Total over			
Time ..... No. cartons examined	Total under				Total O.K.						Total over			
Time ..... No. cartons examined	Total under				Total O.K.						Total over			
Time ..... No. cartons examined . ..	Total under				Total O.K.						Total over			
Time ... . No. cartons examined	Total under				Total O.K.						Total over			
Time ... . No. cartons examined . ..	Total under				Total O.K.						Total over			
Time ..... Total oz. . .	Under ¾	⅝	½	⅜	¼	⅛	0	⅛	¼	⅜	½	⅝	¾	Over

Remarks:

Total O.K. .....
Total oz. under..
Total oz. over...
Difference .....

Form M-207 — Signed..... .....

VEGETABLE PACKING department uses a daily work sheet to record the number of cartons that are examined and the number of cartons that are over- and under-weight.



CHECKING oil content of orange juice with DuNouy apparatus. Oil liberated from peel into juice causes off-flavors and odors that develop in improperly extracted juice.

CALIFORNIA CONSUMERS CORP. has conducted several years of exhaustive studies in the laboratory and plant on quick freezing fruits, fruit juices and vegetables. To insure quality, continuous control tests are made in the plant's well-equipped laboratory.

STOCKING canned goods on wooden pallets in the warehouse. Goods are blocked as to commodity, style of pack and grade.

Perpetual Inventory Method Helps Factory Warehouse

Inventory forms and records simplify warehousing of canned goods. Items are easily located. Stocks are checked by the warehousemen during spare moments

By CHARLES V. DAVIS, Assistant to the President
The G. S. Suppiger Co., St. Louis, Mo.

A SYSTEM designed to whip the warehousing and physical inventory problem in an average canning factory is now about the closest thing to an accurate perpetual inventory. This system was established to cover the needs of a company that took off a trial balance monthly and made up a monthly P & L statement. It has operated with uncanny results, because the warehouse foreman is constantly employing odd, spare moments to check physical stock with warehouse cards and to observe withdrawals, such as laboratory samples, broken cases, swelled cans and pilferage, on these cards.

The physical inventory of canned goods has always been a difficult problem, especially when several different grades of product and style of pack are warehoused. For example, there are five different sieve sizes of peas, with three different grades—Fancy, Extra Standard and Standard. This condition also exists where green beans, lima beans, asparagus and other commodities are packed.

The grade of product must first be considered in solving this inventory problem. By controlling quality from the field to the can, goods can be warehoused so that regrading will be eliminated. In other words, when goods are graded and then delivered to the warehouse, they are warehoused accordingly.

Next, the warehouse must be divided into bins or bays, with an alley approach to each bay. Where the warehouse roof is supported by posts, the floor space is generally equally divided into bays. Bays are then lettered by suspending a block

Three articles won awards of $100 in the "Tough Job" contest conducted recently by Food Industries. This is the third of the prize winning articles. Other prize articles appeared in the September and October issues. The author of this month's article discusses the problem, general in the industry, of simplifying inventory and stock keeping.—The Tough Job Editor.

of wood from the ceiling bearing the letter of the bay. For example, the south side of a warehouse can be lettered "Bay A," and the north side "Bay AA." The next bay can be lettered "Bay B" on the south side and "Bay BB" on the north side. Consequently goods designated as being in "Warehouse No. 1, Bay AA," can be located immediately.

Three different colored cards, approximately 5 in. x 9 in., are then printed from the same form, carrying the same information. Packing data, including date packed, number of cases, grade and code mark, are printed on one side of each card. Shipping data, such as number of cases shipped, consignee, code and date shipped appear on the reverse side of each card.

When the goods are packed and warehoused, one card of predetermined color is attached to the front of the stock. All the packing data are filled in on the card, and the running balance of the cases stacked is entered. Shipments or withdrawals are noted on the reverse side of the card, under shipping data, and the running balance of cases on hand kept current. Orders for shipment are made in duplicate on a standard shipping order form.

Using the Inventory System

When goods are received in the warehouse, they are stacked or blocked as to commodity, style of pack and grade. The warehouseman notes the required information on the production side of the card. One card is then attached to the front of the warehouse stock. A second card is retained for the warehouse file, and the third card is kept for the office files.

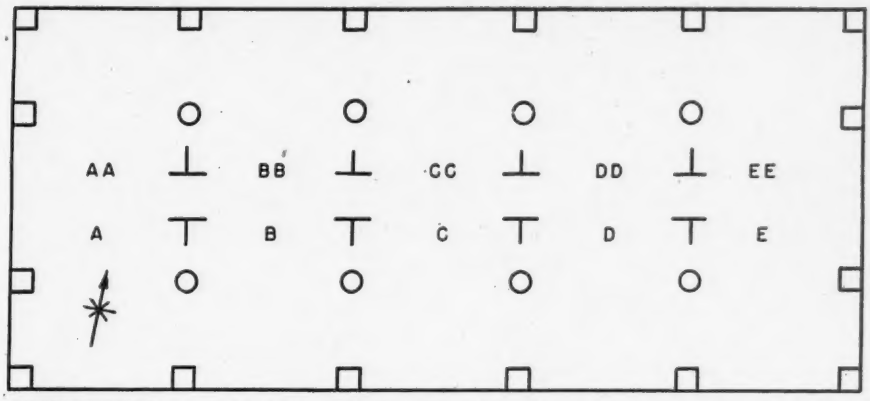
Each time a new lot of canned goods enters the warehouse, packing data are entered, in triplicate, on the production side of a new set of colored stock cards. Two of these cards are kept for the office and the warehouse files, while the third card is attached to the front of the warehouse stock, together with other warehouse stock cards on the same item.

This system is duplicated for all items packed so that at the end of the season the office file is a duplicate of the warehouse file. Both files are a recapitulation of all stock cards in the warehouse.

When shipments are made, the office issues a shipping order, in duplicate, to the warehouse. The warehouseman then fills in all the required data on the shipping order form, noting on the shipping side of the stock card such data as item, grade, code and warehouse location of stock shipped. Also noted are reductions in stock due to bent cans and swells.

After shipments are made, the

(*Continued on page* 199)



WAREHOUSES are divided into "bins" or "bays," with an alley approach to each bay. Where ceilings are supported by posts, floor space is usually evenly divided.

Item _____

Whse. bldg. _____ Bay _____

Grade & style _____ Can size _____

Date packed	Code	Cases packed	Running total

PACKAGING DATA are filled, in triplicate, on one side of stock cards. Two are kept for office and warehouse files. Third card is attached to front of warehouse stock.

Item _____

Whse. bldg. _____ Bay _____

Grade & style _____ Can size _____

Date	Shipped to	Cases shipped	Bal. on hand

SHIPMENTS, withdrawals or reductions in stock are noted on reverse side of stock cards, under shipping data, and the running balance of cases on hand kept current.

SHIPPING ORDER

Factory _____ Date _____

Ship to: _____

Address _____

Via _____ Routing _____

Shipment to be made _____

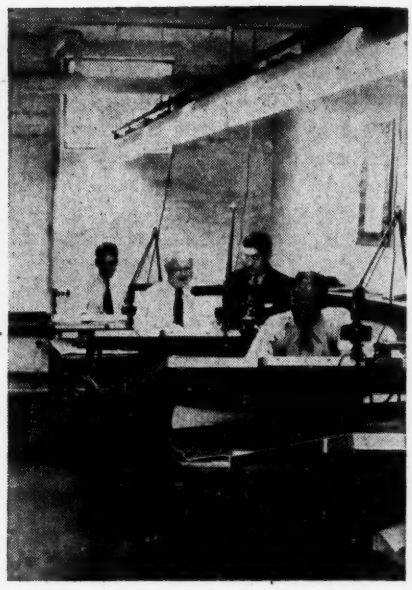
Cases shipped _____ Date shipped _____

Via _____

Cases	Dozen	Item	Grade	Code	Whse.	Location

SHIPPING ORDERS are issued, in duplicate, by the office to the warehouse. Shipping data are recorded on the shipping order form and shipping side of stock card.

MECHANICAL DIVISION of General Mills turns out special equipment when needed for a new product. Having this facility gives company an edge over competition.



DESIGN SECTION of engineering research works closely with pilot plant personnel.

General Mills System Of

There is a correct and logical sequence after economic research

By A. D. HYDE, Vice-President in Charge of Research
General Mills, Inc., Minneapolis, Minn.

DURING the early days of America's industrial revolution, when our economy was young, our population small and our technology relatively simple, it was possible to develop and market a new food product without a comprehensive research program. Occasionally one or two engineers with a basic idea could adapt old technics to new raw materials and come up with a successful food item. They were limited in what they could accomplish, of course, for they had little detailed knowledge of chemical properties, nutrition, scientific consumer testing or the other tools which aid modern laboratories. These limitations were, in one sense, an asset; they applied as much to one competitor as to another. And they narrowed the development problem into a compact field which could be examined thoroughly in a short time.

Group Effort: Basis for Product Development

Today that picture has changed entirely. For the modern food processor, virtually nothing is impossible, but product development has become so complex it is quite beyond the talents of any one man or small group of men, no matter how brilliant they may be. Food research has discarded its baby clothes, pulled on long pants and become a very complex personality. It now demands the combined attention of chemists, nutritionists, physicists, engineers and market research professionals, all highly specialized within their respective fields and all working together toward a common goal. Once he has developed an idea for a new product and proved that it is sound, a food producer's best success insurance is a well-rounded, consistent research program, started early and continued not only until the product is marketed but during that product's entire commercial life.

After basic market research and preliminary economic evaluation, (see FOOD INDUSTRIES, October, 1947) new food product development at General Mills normally begins with formulation. This assignment is handled by the foods and nutrition department of the research laboratories.

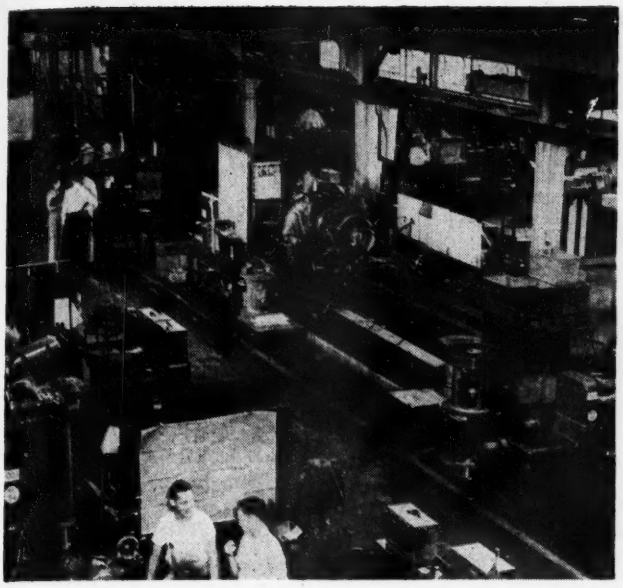
The foods researchers consider the keeping quality of a food product so important that they make it the focal point of their initial attack. That attack usually begins with a comprehensive literature survey, pointed at both recorded experiences with specific ingredients and at information concerning their chemical properties. To make such information readily available, General Mills maintains a research library, staffed by technically trained librarians.

Since, however, research frequently enters entirely new territory, published literature will not supply all the basic information needed. Development requires a thorough program of fundamental laboratory investigation.

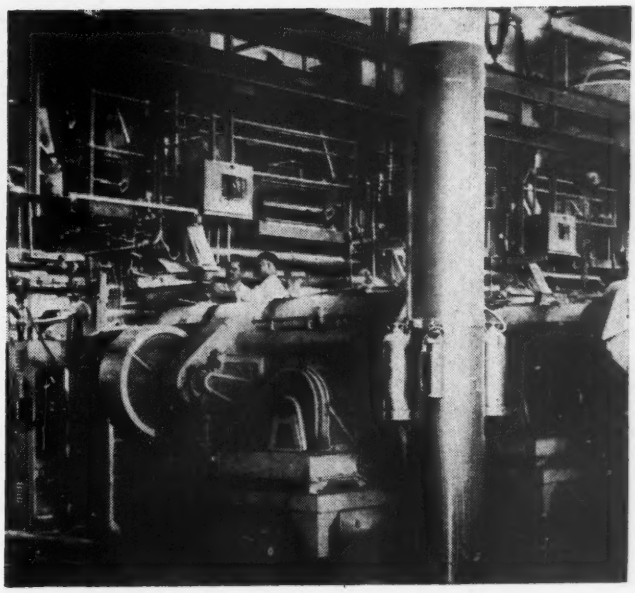
Ingredients Studied

First step in this study is research on the chemical properties and compatibility of the ingredients. Such common reactions as the breakdown of starches and proteins, polymerizations of sugars with proteins, and enzyme changes, are always lurking in food ingredients, ready to trip the unwary; and only detailed research can bring them to light, in the laboratory, before they can do their damage on the grocer's shelf.

Although peroxide numbers, amino-acid determinations, reducing sugar analyses and other technics give good indications of ingre-



MACHINE SHOP is elaborately equipped, enables the company to reduce costs and maintain control of original designs.



CONTINUOUS COOKERS were built for breakfast foods. Machines cook ingredients, extrude dough through dies, at Buffalo plant.

Developing New Foods*

showing that an idea for a new food has a sound basis for success

dient behavior, they are not always dependable. Consequently, General Mills' food and nutrition research department runs actual storage tests on each major ingredient as well as on the combined formula. During the development of Betty Crocker Pea Soup Ingredients, for example, the staff stored 2000 samples of peas—at normal room temperature, under intense light, and at high temperatures (simulating those encountered in a box car during shipment). After each test, they examined the peas for taste, color, viscosity changes, dispersibility and other physical properties. Later, the same tests were applied to ingredients in various combinations.

Armed with the physical and chemical knowledge gained through such studies, the food department prepares a preliminary formula which gradually evolves into the final product. However, its line of evolution is long and tortuous.

Taste Tests

Since pleasing flavor is a prime requisite of all foods, formula development at General Mills is guided by a continuing series of taste tests. At this stage, the testing is done by a panel of from 20 to 30 laboratory employees, selected to represent as nearly as possible a typical cross-section of the consuming public. Obviously, this cross-section is far from perfect, for research workers probably cannot accurately represent the public in general and their frequent participation on the panel often gives them too much of a professional approach. Nevertheless, we have found the system effective for preliminary testing.

Today, flavor is still more an art than a science, and a widely acceptable product usually results from considerable "imagineering." Since even experts disagree as to what constitutes the distinctive, readily recognized flavor so essential to modern food specialties, the reaction of typical consumers is the only satisfactory guide.

Consumer Testing

At General Mills, consumer testing continues throughout the entire period of development. After a product has been prepared to meet the approval of research test panels, it graduates to limited consumer surveys.

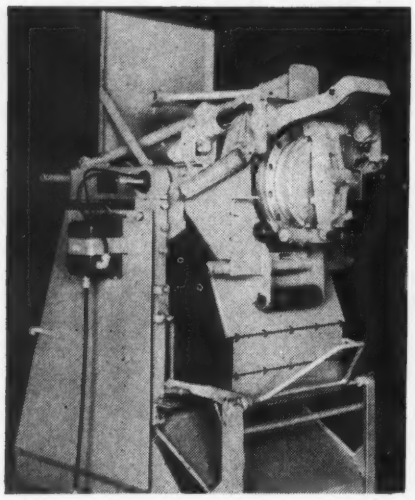
Often these surveys are conducted at "Sip and Snack" bars, sampling booths strategically located in a few major cities. Normally, the booth is set up in a large department store or other retail establishment where it usually serves from 50 to 100 people a day. To make sure that products being tested are fresh and properly prepared, it contains complete kitchen facilities. Samples are given free, and in exchange visitors are asked to answer a brief questionnaire. Since the surveys are comparative, they serve as a valuable guide to subsequent formulation.

Next, Regional Preference Testing

As development progresses, the consumer surveys are broadened, reaching an increasingly larger cross-section of the public. Ordinarily, regional preference tests are next on the list; representatives of our new products commercial research organization take samples to key cities in each major section of the country where typical homemakers are asked to judge the product under normal use conditions. Their questionnaire answers not only indicate general acceptability, but also bring to light regional taste preferences, eccentricities and prejudices; in fact, these surveys, when supplemented by more detailed economic investigation, tell us just about what sales volume to expect in each area.

*This is the second of two articles. The first was published in the October issue of FOOD INDUSTRIES.

New Product Often Requires Special Machinery, Special Packaging



PUFFING GUN, engineered and built by General Mills, explodes cereal products, Kix and Cheerios, into puffed form.

PACKAGE DEVELOPMENT is conducted by physics research department. Here L. F. Borchardt and Clarence E. Felt (right) plan package shipping tests.

FINISHED PRODUCTS may represent 10 years of work, as in the case of Cheerios.

Finally, after formulation and engineering development are virtually complete, the new product goes under the microscope of nation-wide public opinion. And only when it has passed this most crucial of all tests will it become a full-fledged grocery product.

However, discussing finished products is getting ahead of our story, for, as every food researcher knows, stability and flavor development are early milestones on a long, rough road.

Ingredient Specifications

During recent years, that road has been even more treacherous than usual, for material shortages have added to the problems of formulation. One of the prime tasks of our foods researchers is to specify the type and quality of raw materials to be used in a new product. If their specifications are to be realistic and usable they must, of course, list only materials which are readily available at a reasonable price, yet they cannot compromise on quality. Needless to say, those requirements add up to an extremely complex problem.

During the development of our pea soup ingredients, seasoning materials were particularly scarce; in fact, some spices could not be obtained at all. That dilemma was solved, and the present successful formula developed in the only way such problems can be solved with certainty—through painstaking research, combining economic and chemical investigation. While our new products commercial research department determined what spices were available, where they were located and how much they would cost, the food research department found the best possible combination of those available. It was another case of cooperation between specialists—cooperation which must permeate every phase of research.

Pilot Plant Production

New food items, unlike many fundamental scientific discoveries, are not ends in themselves; to be of value, they must be mass-produced —and mass production calls for physical properties adapted to practical manufacturing methods. Consequently, our foods department also conducts preliminary process studies, determining the effect of various processing and packaging technics on flavor, consistency and stability. These studies are later continued on a pilot plant scale, but beginning them early, during formulation, often saves both dollars and hours. Since laboratory tests use small quantities of materials and relatively inexpensive equipment, they are considerably more economical than pilot plant runs; hence, any clue they give to future processing methods is, in effect, a profit. Furthermore, manufacturing problems frequently necessitate formula changes, and these can be made most efficiently while formulation is still incomplete.

Avoiding Nutritional Deficiencies

Somewhat related to process control studies is one of the foods department's most important jobs —guaranteeing that General Mills' products are sound nutritionally.

The staff was a pioneer in the development of vitamin assay and protein determination methods, and it applies original as well as general technics to all new products.

Although it is important to determine the nutritional value of basic ingredients, it is even more essential to know whether or not food values can be retained during processing. If they cannot, deficiencies must be compensated for by enrichment or fortification, and it is the foods department's job to tell us whether or not this is necessary and, in some instances, how it can be accomplished.

In the vast majority of cases, this portion of the foods department work pays for itself many times over. For example, by determining the stages of production at which vitamins could best be added to enrich Wheaties, Kix and Cheerios, the staff not only assured highly nutritious products, but also saved the company thousands of dollars in vitamin costs.

Packaging Development

As the formula for a new product evolves, packaging development, conducted by our physics research department, keeps pace with it. Since the type of package required depends upon the properties of the ingredients, the staff begins by studying the formula. As a basis for further development, they must know the answers to five questions: (1) Does the product contain a large amount of fat? (2) In what form is that fat? (3) Is the product hygroscopic? (4) If it is, what are its moisture limits? (5) Will it remain stable in the presence of oxygen, or is an airtight container necessary?

The first two questions may be simple; in most cases, they are answered by the formula itself.

But those answers can mean trouble. Any product which contains a large quantity of fat in a relatively soft form must be packaged in a grease-proof material; otherwise, grease will seep through the barrier, destroying the attractiveness and sales appeal of the outer carton. Since economy is always important in packaging, finding a commercially practical grease-proof liner is usually a major job.

The next two questions, "Is the product hygroscopic?" and "What are its moisture limits?" can best be answered by moisture-vapor equilibrium studies. These are done by determining the water content of a series of samples before and after storage under controlled conditions, and by inspecting for quality at various moisture levels.

Although the chemistry of the formula gives some indication of a product's reactions with oxygen, only actual storage tests will reveal conclusively whether or not an air-tight container is necessary.

Once they have determined the general type of package required, the physics staff prepares a preliminary design, which is translated into several hand-made packages. These, in turn, are filled with typical samples of the new product and subjected to storage tests.

Package Testing

Some packages are stored at normal room temperatures, while others are placed in General Mills' "weather room," where they are subjected each day to alternately rising and declining temperatures ranging from 70 to 90 degrees Fahrenheit at a relative humidity of 65 percent. At definite intervals, set by prearranged schedule, the staff examines several of the samples for physical, chemical and taste characteristics.

Guided by the results of this first test, the staff modifies its original design and repeats the storage experiments until it develops a package which gives satisfactory protection under laboratory conditions. Later, similar tests are run on sample packages packed and sealed on large scale, commercial equipment. If these confirm earlier results, the package is recommended to manufacturing executives. It was this technic which produced the unique and effective package for Apple Pyequick, General Mills' newest grocery product.

The work of the physics department does not, however, end with development of a package. On the contrary, the section keeps tabs on that package during its entire life. Research and products control departments personnel select random commercial packages of all General Mills products from all parts of the country, sending them to Minneapolis for storage tests.

In addition, the research and products control departments have developed a mathematical formula which enables them to calculate the probable shelf-life of a new product in any given locality. Needless to say, this is a valuable guide to sales executives.

As I indicated in my previous article (FOOD INDUSTRIES, October, 1947), we at General Mills consider market research extremely important; it is absolutely essential in measuring the feasibility of new ideas, and it is an invaluable ally in product development.

Where Commercial Research Fits In

In addition to conducting the consumer tests which guide formula and process studies, our new products commercial research organization maintains a continuous program of detailed economic investigation. It is the group that tells us the probable market volume of the product, outlines distribution channels, prepares cost estimates for ingredients and packaging materials, recommends package size, suggests prices and reports probable profit margins. It also tells us whether or not our formula and processes will enable us to meet competitor's prices and, in cooperation with the advertising and grocery products departments, selects and tests brand names and prepares advertising and selling claims. In short, the new products commercial research department is the cord that binds scientific development to economic reality.

While market research is fastening that cord, however, product research continues to move toward a finished grocery item. After formulation and preliminary packaging studies, the embryonic product is sent to our engineering research division for pilot plant experiments.

Engineering Research Parallels Commercial Research

The pilot plant has often been called the link between basic research and production. It is that, of course, but it is also a great deal more. In a broader sense, it is a part of basic research, contributing directly to product development as well as determining engineering data necessary for commercial manufacture.

General Mills' engineering and foods research personnel cooperate throughout a new product's entire pre-production life. By working together, they avoid the common dangers of evolving a formula which cannot be manufactured or beginning commercial production with technics which destroy important qualities of an otherwise sound product. Furthermore, they avoid these pitfalls during early development when they can be avoided with the least possible cost and delay.

Three Objectives of Pilot Operations

Although the specific ways in which the pilot plant serves development are much too numerous to mention here, they fall under three general objectives. First, the pilot plant conducts operation studies to determine the most efficient processes for manufacture, at the same time assembling accurate cost data. Second, it produces samples of the product for consumer testing. Since pilot plant operation closely simulates commercial production, these samples are, of course, more representative than hand-made, laboratory packages. Third, it selects the proper equipment for manufacturing the product. This last but certainly not least important function involves not only the testing of commercially available equipment but also establishing the need for special machinery.

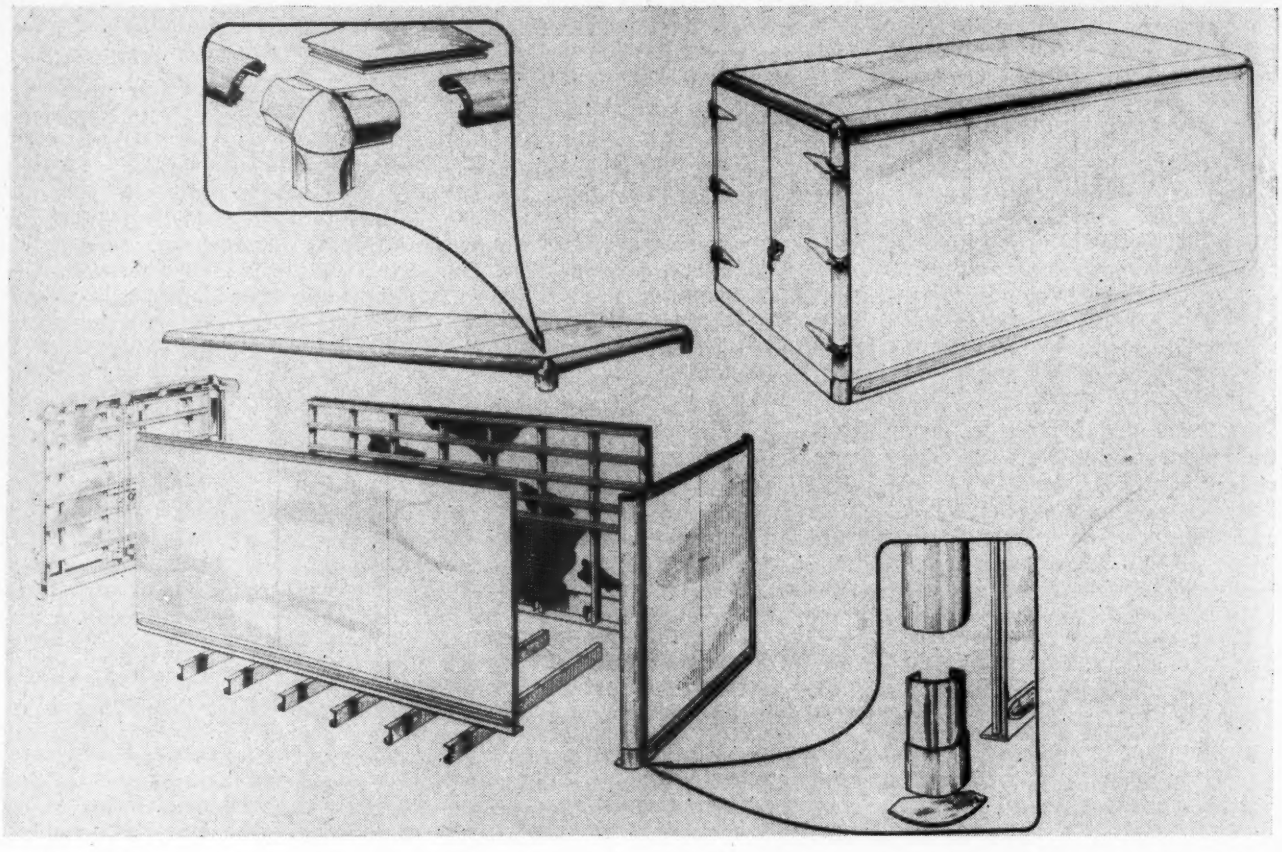
Equipment Design

If that need *is* established, General Mills carries the problem two steps further, designing and often manufacturing the equipment. For the first step, our engineering research organization includes a design section, staffed by experienced engineers. Since this group works in close contact with both foods and pilot plant personnel, it is in a uniquely advantageous position to develop machinery tailor-made for the new product.

At the same time, our mechanical division, which grew from a mechanical development facility, and gained added precision skills through wartime production of fire control instruments, stands ready to manufacture this machinery for our operating units.

This design-production teamwork assures General Mills reasonably low-cost equipment, perfectly suited to its job. In addition, it keeps

(*Continued on page* 200)



THE SECTIONS, with enlargements of corner castings that insure rigid joints, are shown at left. The assembled job is at upper right.

Build Your Truck From Standard Aluminum Parts

Individual styles in van type truck bodies, which previously required practically a custom built job, are possible with these standard fitting sides, doors, etc., of varying lengths, heights and designs

OVER 10,000 different aluminum van type body combinations, with rear openings, and of various lengths, widths, heights and interior trims, can be assembled by local body builders from standard parts, mass produced by the truck and trailer division of the Reynolds Metals Co., Louisville, Ky.

With the greatly increased wartime production of aluminum for our vast airplane program, this new postwar development in truck body building will make aluminum more generally available in the field of transportation. The food field truck owner will thus be able to enjoy the many advantages offered by aluminum bodies, and at much lower cost than previously.

Except for the small sized standard bodies, sold complete with the chasses by the large volume truck manufacturers, truck bodies have been custom built, heretofore, and made mostly in the cities where the trucks on which they were mounted were to be operated.

Even when the trucks were of the same make and wheelbase and were to haul the same products, each truck owner wanted some different combination of length, width, height, or rear doors or an open end with a tailgate. This made each body a custom built job, cut and fitted to suit the individual owner.

Some economies in the body cost were obtainable if ten or more bodies of the same specifications were constructed at one time. But otherwise it was a case of cut and fit to suit each individual body.

In addition, the method of constructing or fitting the body together varied in almost every instance. Except in the case of all steel bodies, the studding was of wood with metal side sheets of either steel or aluminum. Corner posts were of metal or wood and roofs over wood bows were tin or canvas over wood slats.

Then there were innumerable combinations of rear openings, such as full opening with a lazytong type of folding gate; half doors over a tailgate; open over a tailgate or full height half doors. These few examples give a good idea as

THIS COMPLETED truck body is similar to the one illustrated opposite, except that modified wheel wells were chosen in place of straight bottom rails.

to why each individual body was in reality an expensive custom made job.

In the Reynolds standard parts aluminum body, all parts are of aluminum except the floor which is of wood. Each body consists of cross sills, sides, ends, roof, corner posts and connecting roof and floor rails. These essential parts are all shown in the accompanying put-together illustration.

In producing these parts in volume and keeping them in stock, the Reynolds company performs only that portion of the body building which it is equipped to do at the lowest cost. When a Reynolds aluminum body is ordered from a local body builder, all the latter has to do is to order the required parts and put them together at his local plant. When repairs due to accidents are necessary, those sections needing replacement can be ordered from the Reynolds factory stock and installed without further manufacturing operations.

To meet all requirements of the food field truck owner, all the sections are made in a wide variety of sizes. For example, the sides are made in three basic types including a full straight side such as shown in the put-together illustration; a modified wheel well side such as shown in the illustration of the Eberhard's Super Food Markets body and a deep wheel well side.

To connect the sides and ends with the roof and the floor sills, top and bottom, aluminum corner castings are provided, together with vertical and horizontal aluminum rolled sections. These are fitted together to form rigid joints, as shown in the put-together illustration.

The flat skin of the aluminum roof is riveted to the curved roof rail with explosive rivets assuring a tight seal, which will not open regardless of road conditions. Similarly, the flat side skin is riveted to the side rolled channel sections to provide a sturdy, rigid connection.

Choice of Openings

The rear opening of the body is one of the most important items of design because it affects the operation of the truck. To meet every conceivable operating condition, no less than 15 rear door opening choices are provided in the Reynolds bodies. These vary from a full rear opening, with no doors at all, to a full closed back without a door.

In between these two extremes, other choices include full height doors of the solid or roll-away types; half doors with two different heights of tailgates and lazytong or accordion type gates with or without tailgates.

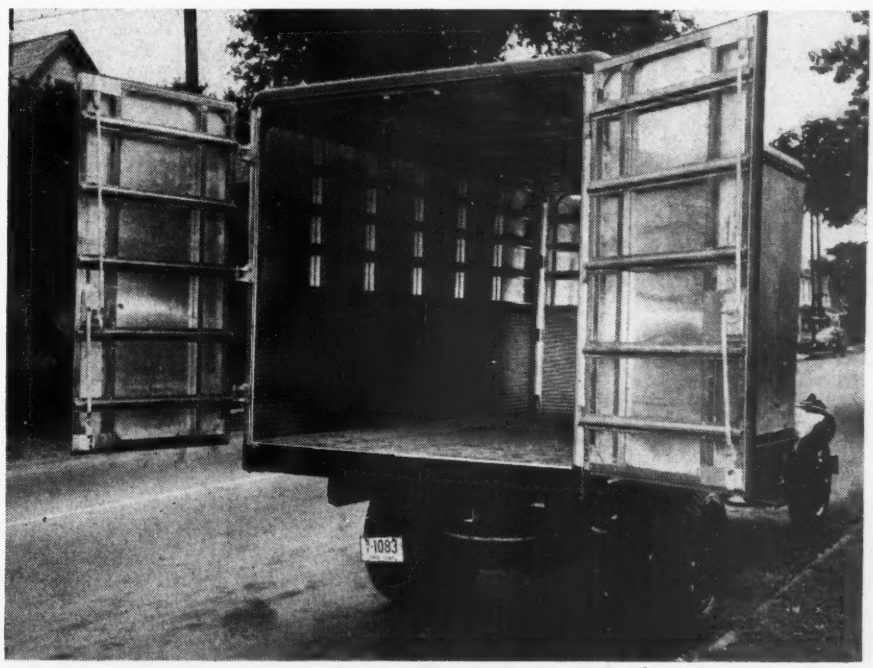
Two side door choices are provided, one for the street side of the body and the other for insertion on the curb side. In addition, a ventilator detail is provided for insertion as desired.

Interior trim is also an important item in body design. This is true from the standpoint of both structural strength and of use by the truck driver. Here again the Reynolds body design has attempted to meet all requirements. It provides seven different choices. These vary from a bare interior with no trim at all to a refrigerator lining.

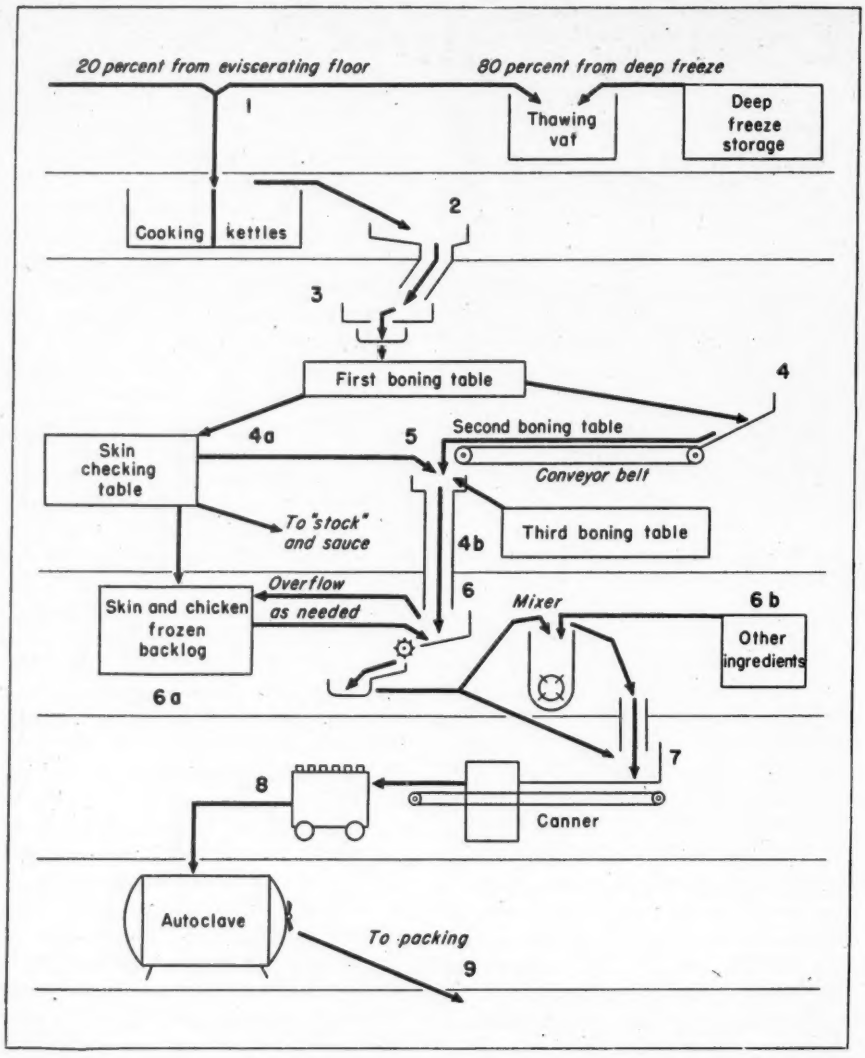
In between trims include a smooth skin; half slat; full slat; half slat with half corrugated and full corrugated. Both the smooth and corrugated skins can be furnished to accommodate 1½ in. of insulation.

Light weight, the elimination of the rusting-away problem and the ability to carry a heavier payload by reason of the lighter body have been the principal advantages of the aluminum body. In addition, wartime developments have produced aluminum alloys having the same strengths as many structural steels but at one-third the weight.

The decreasing price and greater availability of aluminum in recent years also presage greater use.



ANOTHER COMBINATION uses slats in upper half and corrugated sheets in the lower portion. The wood floor is the only non-aluminum part of the body.



FLOW CHART (above) shows steps involved in chicken-boning operation. Numbers designate sampling stations.

COUNTS OF ORGANISMS (tables to right) after various operations.

BACTERIAL SPECIES (below) on fresh-killed, bonded and frozen eviscerated poultry.

TABLE A—Relative Numbers and Types of Bacterial Species Isolated from Eviscerated Poultry.

Genus	Surface of freshly killed chicken (186 cultures)	Eviscerated poultry stored frozen (30 cultures)	Bone marrow Freshly killed (3 cultures)	Bone marrow Stored frozen (8 cultures)	Boned chicken freshly produced (48 cultures)
Escherichia	(numerous)*	3			(numerous)
Aerobacter	(numerous)	1			(numerous)
Micrococcus	50	7	3	3	34
Alcaligenes	38	3			(numerous)
Achromobacter	34	10		1	(numerous)
Paracolobactrum	13	4			(numerous)
Flavobacterium	9	1			1
Proteus	7	1			(numerous)
Bacillus	7				5
Pseudomonas	6				
Staphylococcus	4	1			
Microbacterium	4				
Eberthella	3				
Sarcina	2				
Diphtheroids	2				3
Gaffkya	2				
Streptococcus	1			1	
Corynebacterium (gallinarum)	1				
Neisseria	1				
Oidium	1				
Torula	1				
Hemophilus (gallinarum)				1	
Actinomyces				2	

*These genera were encountered quite often but their numbers were not included in the strains specifically studied.

TABLE I—Changes in Numbers of Viable Microorganisms in Chicken and Turkey Meat During Boning.

Station	Time after cooking, min.	Total counts, per gram*	Coliform counts, per gram*
1	0	108,000	2,300
2	0	18,200	350
3	30	43,000	390
4	60	3,360,000	450,000
4a	90	1,600,000	129,000
4b	90	8,000,000	425,000
5	93	500,000	26,100
6	95-145	9,520,000	565,000

*Total counts determined on tryptone glucose extract agar and coliform counts determined on Difco violet red bile agar.

TABLE II—Number of Viable Microorganisms in Freshly Boned Chicken and Turkey Meats Prior to Canning or Mixing in Quick-Frozen Products.

Pooled sample number	Total counts, per gram	Coliform counts, per gram
1	2,000,000	2,433
2*	110,000	0
3	412,000	10,000
4	1,180,000	31,000
5	1,680,000	8,500
6	2,350,000	28,800
7	7,000,000	39,600
8	7,000,000	32,700
9	85,000	100
10	5,120,000	100,000
11	5,500,000	39,000

*Boned turkey.

TABLE III—Total Counts of Non-Viable Bacteria in Processed Foods Containing Chicken.

Sample	Average counts, per gram*
Boned turkey	340,000
Boned chicken	900,000
Chicken fricassee	760,000
Creamed chicken	340,000
Noodles with giblets	880,000
Chicken and noodles	1,080,000
Southern-style chicken	1,860,000

*Counts determined by Breed smears.

TABLE IV—Numbers of Viable Microorganisms in Quick Frozen Foods Containing Boned Chicken.

Time of sampling	Sample number	Total counts, per gram	Coliform counts, per gram
After packaging, before freezing	1	8,000,000*	20,600
	2	9,000,000*	15,900
	3	8,000,000*	26,400
	4	9,000,000*	22,500
	5	9,000,000*	23,400
After storage at —37 deg. F. (time unknown)	6	272,000	70
	7	327,000	110
	8	900,000	2,250

*Estimated counts. Highest dilution too numerous to count.

TABLE V—Numbers of Viable Microorganisms in Chicken Fricassee Before and After Filling in Cans (Before Autoclaving).

Sample	Total count, per gram	Coliform count, per gram
Wing and thigh*	5,000,000	100,000
Thigh and breast*	5,000,000	100,000
Chicken fricassee**	2,630,000	51,000
Chicken fricassee**	2,740,000	27,700

*Raw chicken destined for chicken fricassee.

**Canned chicken fricassee before autoclaving. Contains liquid stock as well as chicken meat.

Poultry Boning Plants Need Bacteriological Control*

Cooking reduces and boning increases bacteria in poultry meat. Bacterial tests serve as indexes of unsanitary production of canned or frozen items

By MILLARD F. GUNDERSON, KENNETH D. ROSE and MARY J. HENN
Dept. of Pathology and Bacteriology, Univ. of Nebr., College of Medicine

IN the course of a survey on the bacteriology of chicken boning operations, we found boned chicken meat grossly contaminated in one plant, and the boning operations in need of better sanitary control. For example, in a sample experiment total counts increased 520-fold and coliform counts increased 1600-fold during the 145-min. interval between cooking and chopping of the boned chicken meat.

Further bacteria increases in chicken boning also occurred. Total counts in excess of 9,000,000 per g. were found in fresh-frozen food in which the meat was further diluted with other ingredients.

Need for better plant sanitation in the manufacture of precooked frozen foods has been emphasized by Hutchings and Evers.[1] They state that precooked foods have a low count after cooking but, due to their being excellent media for bacterial growth, danger of gross bacterial contamination is great.

At present, no standards exist for the bacteriological grading of fresh or precooked frozen foods such as the standards one finds for milk. The precooked food industry can, however, by proper bacteriologically controlled production methods, produce a product with bacterial counts similar to those set down for milk. The industry should undertake the problem of attaining this goal. It is a credit to the majority of the producers, however, that they are aware of the possibilities of bacterial contamination.

In one plant the product was grossly contaminated, despite the use of the latest stainless steel equipment and application of sanitary measures. Industry might rightfully ask, what more can we do? By studying the sanitary aspects and plant malpractices, an attempt can be made to answer this question. The frozen food industry and the public will also profit by an airing of bacteriological data obtained in plants producing chicken-containing foods.

MEDICAL "PIE"

Here is an interesting situation in which the junior authors, one a medical student and the other now an intern, gained experience in the problems of the food industry. Several other medical students have had their fingers in the food processing "pie". Such experience would be of value to future medical officers, giving them better comprehension of the sanitation and food spoilage and poisoning problems of the industry as well as the rights of the consumer.—The Editors.

To prevent the occurrence of enteric disease epidemics traceable to fresh-frozen and precooked frozen foods (with rigid government control a probable consequence), the frozen food industry must recognize certain dangers. In the boned-chicken industry, for example, industry should recognize the following:

1. Various paratyphoid organisms, capable of producing intestinal and other complicating infections in man, have been isolated from eviscerated poultry[2].
2. Paratyphoid and typhoid bacilli survive for long periods of time in frozen foods[3, 4, 5].
3. The botulism organism and its toxin survive indefinitely in frozen foods and remain potent after prolonged freezing[6].

Failure to recognize these signs of danger and to assure rigid bacteriological control will ultimately lead to difficulty.

Processing Methods

The flow chart in this article shows the different processing steps involved in the chicken-boning operation and how these steps influence the bacteriology of chicken-containing foods. Stations in the following description are identified on the flow chart.

Station 1. About 80 percent of the eviscerated chickens boned are taken from –12 deg. F. storage rooms. The remaining 20 percent come directly from the eviscerating floors. At station 1 the birds are received from thawing tanks where the frozen chickens are defrosted in running tap water for 18 to 24 hours or from the cooler where they have been kept overnight after they had been defrosted or eviscerated the preceding day.

Station 2. Between stations 1 and 2 the chickens are cooked for boning. Birds must be adequately cooked so that the meat pulls easily from a leg or thigh bone. Consequently, cooking times vary from a quick dip in boiling water for young spring fryers to two to three hours for the tougher hens and turkeys. At station 2, birds are cooked and conveyed by chute to the boning floor. Often preliminary boning and disjointing are carried out at this stage by two to three workers.

Station 3. At this station the cooked chicken passes through the chute into a trough. Birds are held about 30 minutes in the chute where they are cooled to room temperature to facilitate handling.

Station 4. Whole or disjointed birds are carried in metal pans to the preliminary boning table. About 24 workers pull meat from the bones, discard the bones and place meat and skins in separate metal pans. Pans are collected separately, and the meat is deposited at station 4 and skins at sta-

*Research undertaken in cooperation with the Committee on Food Research of the Quartermaster Food and Container Institute for the Armed Forces.

tion 4a. Time elapse from stations 3 to 4 is about 30 minutes, and time elapse at station 4 before the meat is placed on the conveyor belt is about two to five minutes.

Station 4a. Skins are rehandled and the meat removed is sent to station 5. Skins may be either frozen or sent down a separate chute to the mixing floor, where they are ground for stock broths. The skins are either frozen and sold as such or thawed out for use at a later date. Time elapse at this station is about 30 minutes.

Station 4b. From station 4 the meat is distributed onto a conveyor belt where 12 workers examine the meat for bones. Bones containing meat are placed in pans and taken to another boning table where the meat is removed and transferred to station 5. Time elapse at the third boning table is about 30 minutes.

Station 5. The pooled mass of meat from the boning tables is collected at this table and then transferred by chute to the mixing floor. Meat remains in the chute for only a short time.

Station 6. It takes about two to five minutes for the meat to travel from station 5 through the coarse chopper to station 6. Often the pooled meat consists of chicken from the frozen backlog. When the boning floor produces more than can be used for immediate canning, the meat is weighed, packed in waxed paper cartons and held in –12 deg. F. storage rooms. Meat is removed from storage when needed, defrosted with or without the aid of steam and then added to the pooled meat from station 5. It usually takes one to two hours to weigh, package and place the meat in the freezer. In addition, it takes about ten hours to freeze the meat. During these periods bacterial counts increase rapidly.

Station 6a. This station represents the frozen backlog where overflow meat and skins are stored, awaiting use. Meat and skins are held in the deep freeze from one to seven days.

Station 6b. Various ingredients, other than chicken or turkey meats, are added to the finished products at this station.

Station 7. After the meat is chopped, it takes various routes to the canning floor, depending upon the product produced. Meat for canned boned chicken is either transported by cart to the packing floor or sent down the mixing chute. Holding time in either method is 30 minutes or more. During noon hour, the chute is not often emptied.

When chicken and noodles, Southern style chicken and other similar items are produced, the meat is mixed with other ingredients and sent by chute to the canning floor. Meat for frozen products is mixed with other ingredients, packaged and frozen.

Station 8. The canned boned chicken operation is completed by packing meat in cans and adding one to two oz. of stock consisting of chicken fat, ground chicken skins, salt and water. The stock is prepared on the mixing floor and piped to a reservoir at the canning machine, where it is warmed before it is added to the meat. Cans are then sealed.

Station 9. Sealed cans are then processed. Processing times vary with the different items, but usually run about 90 minutes at 245 deg. F. Quick frozen foods may be frozen in a freezer tunnel at –37 deg. F. or in a Birdseye multiplate freezer.

Bacteriological Methods

To determine the bacterial population at various points in the flow line, samples were collected in triplicate with sterile knives and spoons at each of the stations studied. Samples were pooled in a tared, sterile jar and taken to the laboratory. About 30 minutes elapsed from sampling to plating. Samples for direct counting were taken from freshly-opened canned material under study.

Bacteriological examinations were conducted according to the procedures outlined by the Committee on Standard Methods for the Microbiological Examination of Foods of the American Public Health Assoc.[7] Food samples were macerated in a Waring blender with 9 ml. of sterile water per g. of sample to give a 1:10 dilution and plated from that and higher dilutions in tryptone glucose extract agar. Appropriate dilutions were also plated in Difco violet red bile agar to detect coliforms.

The modified Breed technic for direct microscopic examination was followed with one exception. Original material was diluted with equal parts of water, agitated and clarified by centrifuging for one minute at 1000 r.p.m.

Macerated samples were examined for presence of enteric pathogens. Technic in most cases involved inoculating 1 ml. of macerate into either Difco tetrathionate or B.B.L. Selenite-F. broths, followed by streaking on combinations of desoxycholate citrate (B.B.L.), MacConkey's (Difco), Shigella-Salmonella (Difco) and bismuth sulfite (Difco) agars. Colorless colonies appearing on incubation were subcultured and identified by a partially confirmatory pattern. Suspected enteric pathogens were further studied by cultural methods.

Boning Operation

Specimens were taken from the different stations to determine how boning influenced the bacterial content of chicken meat. Table I shows an increase in bacterial numbers between stations 2 and 6 during one day's run. Poultry processed each day was usually a mixture of hens and spring fryers. Consequently, no correlation could be made between cooking times and bacterial count. A decrease in bacterial counts was observed, however, between stations 1 and 2. Counts were reduced to 73 per g. when poultry was cooked 2 to 2½ hours.

Counts at station 5 were usually lower than anticipated. This was probably due to selecting samples at random, especially meat which did not pass through stations 4a and 4b.

Coliform counts on violet red bile agar were similar to the total counts. Counts ranging from 0 to 400 per g. were obtained with 12 samples taken during four days' production at station 3 and three other samples from station 2. These results show that low counts can be obtained in freshly cooked chicken.

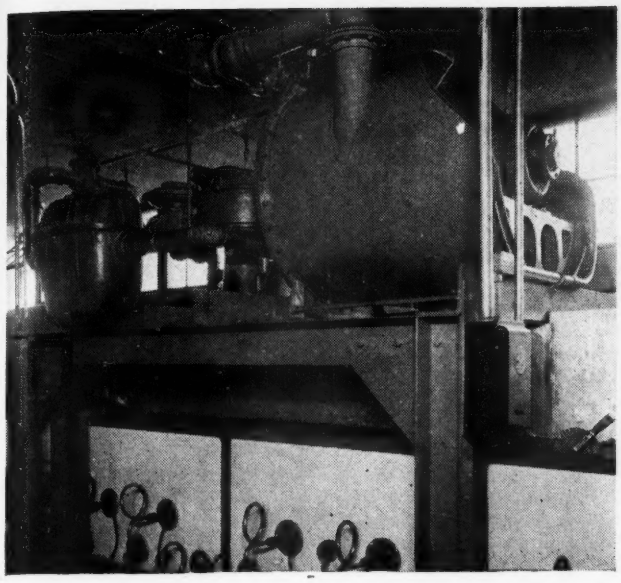
Table II shows total counts ranging from 85,000 to 7,000,000 per g. in freshly boned chicken. Coliform counts ranged from 0 to 39,600 per g.

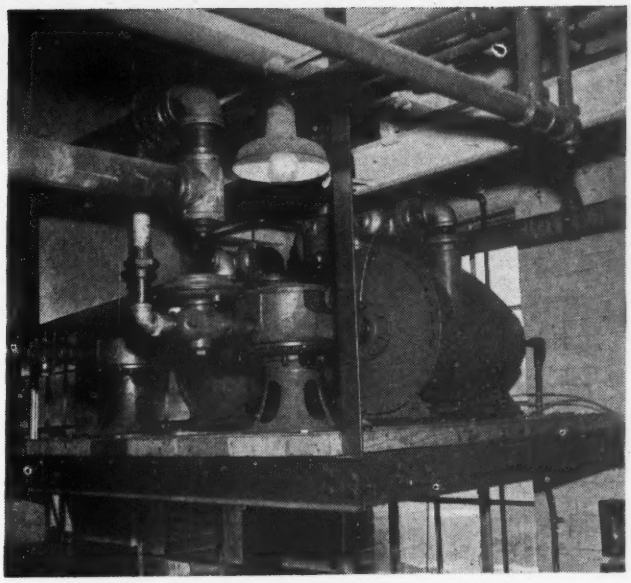
Canned Chicken Products

Various kinds of canned chicken products were examined for nonviable bacteria by a modified Breed smear method.[7] Table III shows that direct counts by the smear technic were usually less than those obtained by plating identical material before autoclaving. Breed smears had lower total numbers than plate counts.

Table IV shows that the finished product held for an unknown period of time in the –37 deg. F. freezer gave lower counts than the finished product before freezing. This is probably due to a better sanitary condition in the plant at this time, since the unfrozen sam-

(*Continued on page* 198)





IN THE PLANT: Oven-roof carburetor installation (left), and air-gas pressure premix equipment mounted on a platform suspended from the ceiling (right), save floor space and protect equipment.

Use Your Headspace

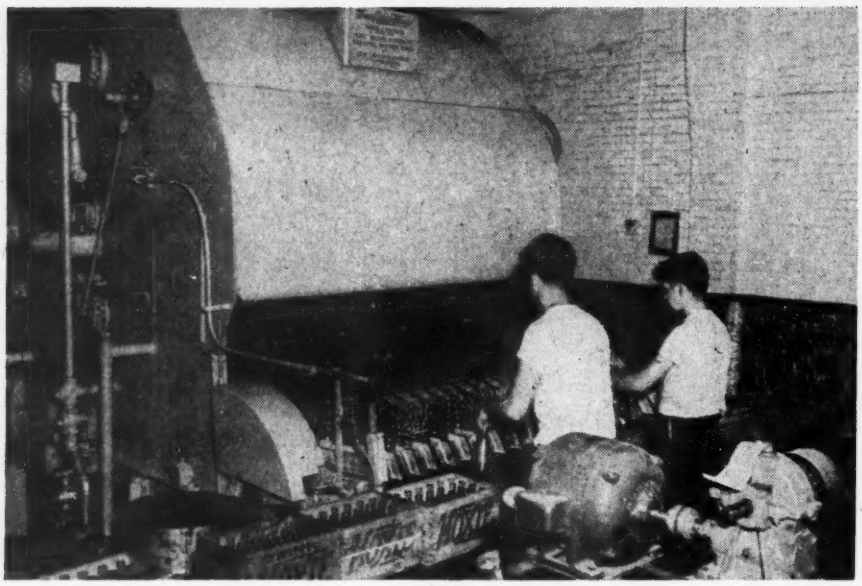
A SUBSTANTIAL saving in floor space may often be achieved by mounting auxiliary equipment on top of primary units, suspending them from ceiling or roof, or mounting them on specially constructed overhead platforms. An additional advantage is the isolation of the equipment from floor hazards, such as plant trucks and cleaning operations.

The C. M. Kemp Manufacturing Co., of Baltimore, Md., has used this principle to good advantage in the case of its "pressure-premix" system for mixing gas and air to supply large numbers of burners in bakeries. These systems involve considerable bulky equipment, as can be seen by the photographs above. Mounted in this way, they are accessible for inspection and maintenance, yet protected from damage.

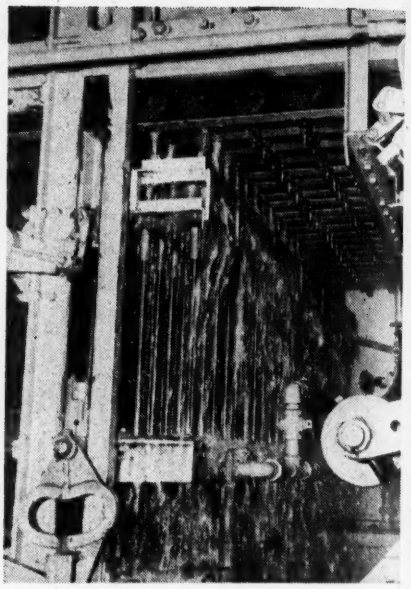
At the Pennsylvania Sugar Co., an electric donkey engine, mounted on a heavy overhead platform, operates a hoist which unloads raw sugar (seven 325-lb. bags at a time) from a load truck onto a conveyor. In this way sugar is unloaded from ships and placed in storage bins with a minimum of handling.

Other applications of this principle are: Unit heaters suspended from the roof or ceiling of large processing rooms or warehouses; motors and drive units for conveyors, mixers, packaging machines and cutting and slicing machines, built atop the units; fans for drying, cooling or exhausting steam or undesirable fumes, mounted near the ceiling; and electrical control and safety devices mounted above the main unit, yet accessible for easy maintenance.

IN THE WAREHOUSE: Overhead mounting of donkey engine (left) facilitates hoisting of raw sugar from load truck. Roof suspension prevents damage to unit heater (right).



RECEIVING END of new 5-section washer that handles 20 7-oz. bottles in a row through four caustic wash sections. After caustic wash, bottles pass on to rinsing station.



SPINDLE RINSE sprays filtered water at 80 psi into inverted bottles.

Heavy Emphasis on Sanitation

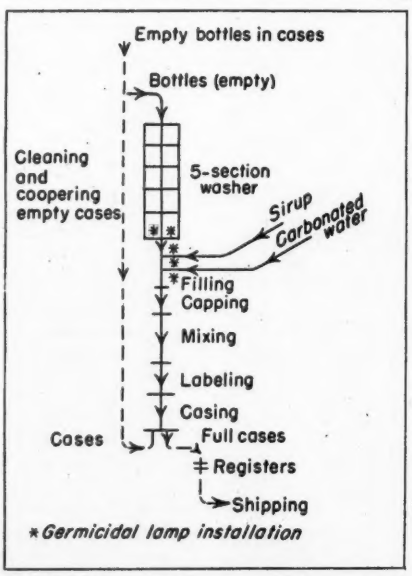
Hooded conveyors and germicidal lamps over open bottles—chromium plated chain

By H. S. KNOWLTON, Boston

SINCE starting business over 60 years ago in Lowell, Mass., cleanliness has been a fetish with the Moxie Company. In its present Boston plant, modern equipment and methods have brought plant operations to a level of sanitary perfection comparable to hospital practice. From the initial percolation of roots, herbs and liquid material for making the sirup, to automatic casing of bottled Moxie, operations are of the straight-line type.

The bottling department illustrates the latest advances in cleaning, mixing, filling, sterilizing, capping, labeling and packing, reversible conveyors being employed to minimize manual work at all possible points. Operators control all steps of the process and supervise the working of machinery; but the bottling department functions as a fully automatic unit from the time the cases of empty bottles arrive and the bottles are placed in the receiving end of the washer, to the placing of clean cases by hand at the delivery end of the packing machine, and transfer of the bottled product to the conveyor leading to the shipping department.

Throughout the plant the use of stainless steel piping has become standard for transporting liquids and gases. Glass piping is used to some extent, also. Floor tiling is maintained without cracks. Chain hoists for lifting sugar barrels have been chromium plated to eliminate the possibility of dirt or rust forming on links or other parts—a most unusual precaution. In the sirup room, the percolators are raised 3 to 4 ft. above the floor; for no chance can be taken of rust getting into this section of the production line. The hoists were chromium plated in 1926, 1932, and will be replated in 1948. Even the shovels used for handling ingredients are chromium plated in order to avoid any chance of using an ordinary floor shovel.



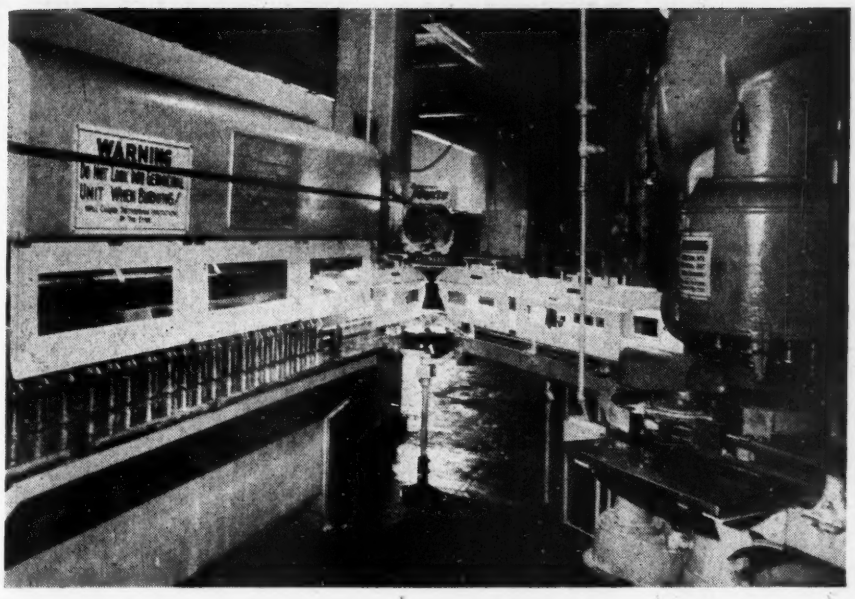
SCHEMATIC LAYOUT of bottling department showing locations of ultraviolet lamps to protect open bottles from air-borne bacteria.

Plan to Use Liquid Sugar

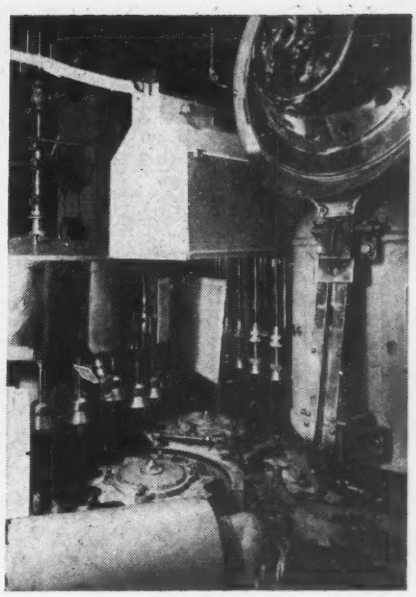
It has been decided to use liquid sugar in the near future in place of granulated. This will enable the plant to do away with the attendant hoisting and emptying of these containers into tanks in the sirup department. The liquid sugar will be pumped into the proper tanks through chromium steel piping and fittings, and will not be exposed to the air in this connection.

The use of ultraviolet sterilizing lamps to eliminate air-borne bacteria is an important feature of the bottling department. Routine painting within the plant and a rigidly enforced schedule of cleaning equipment and washing out piping, tanks, and the interior of machinery handling sirup, fresh and carbonated water, is in vogue.

Daily at 4:30 p.m. all sirup pipe lines are flushed with boiling water



STERILE RINSED BOTTLES are delivered to filler through a tunnel in which ultraviolet lamps maintain sterile atmosphere. Note how washer is mounted on concrete blocks.



GERMICIDAL LAMPS over the transfer from filler to crowner protect against bacteria.

At Moxie's Boston Plant

hoists and shovels—liquid CO_2 in bulk—feature Moxie's modernized bottling plant

and then by a detergent* solution. A solution of chlorine (200 parts per million) is allowed to stand overnight in empty sirup tanks and pipes. Early next morning, the pipe lines and tanks are flushed out with boiling water, rinsed and cleared with cool, filtered water. While the company recognizes that chlorine solutions present some hazard when used in connection with brass and copper piping, no trouble has been experienced in over a year's operation with stainless steel in the above concentration. Daily the outside of all equipment is sprayed with a solution of hot chlorine water. Boxes returned from the consumer trade are thoroughly cleaned and, if necessary, repaired before being returned to the conveyor line for re-use. All departments are gone over daily to make sure that each day's production starts under conditions of maximum cleanliness.

System in Bottling Department

This department has within the last few months been equipped with a complete installation of Liquid Carbonic machinery forming a production line with a rated capacity of 175 7-oz. bottles per min. It is planned to install a second line in the near future to bring the rated capacity of the department to 350 7-oz. bottles per min., compared to a departmental capacity of 230 bottles per min. for the equipment now superseded by the machinery which went into service early this year. This development is a far cry from a production rate of 3 bottles per min. under hand operation half a century ago in the Lowell plant.

Empty bottles, 24 per case, arrive in the bottling department by conveyor from the receiving department on the street floor below, where direct delivery has been made to the conveyor from trucks. Attendants transfer the bottles from the cases to the moving belt line of the new "SuperKleen" washer, which handles rows of 20 7-oz. bottles. The previously used washer equipment could handle rows only 12 bottles wide. The new washer has five sections:

Tank	Solution	Temp., deg. F.
1	Caustic soda, 4 percent concentration..	135
2	Caustic soda, 3.5 percent concentration..	170
3	Caustic soda, 2.5 percent concentration..	150
4	Caustic soda, 1.5 percent concentration..	135
5	Filtered fresh water for rinsing sprays	

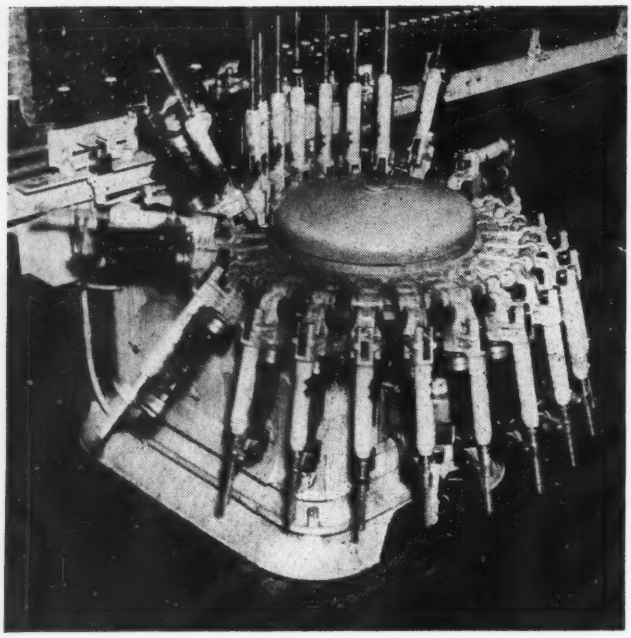
The bottles travel from tank to

Regulations for Quality

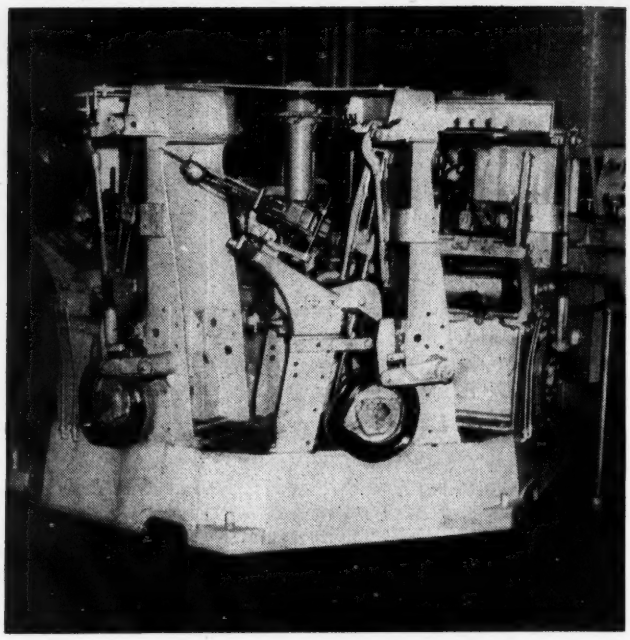
Staff includes a full-time chemist responsible for quality production. The following strict rules apply to manufacturing activities:

1. **No bottle to be touched between arrival at washer and delivery from capping machine.**
2. **All container and piping from sirup room to filling machine to be of stainless steel. Glass-lined tanks may be used as required.**
3. **All machinery must be sterilized daily. Each utensil employed in production must be sterilized immediately after its use.**
4. **All stainless steel pipe lines leading to filling equipment must be washed daily with hot water, detergent solution of 200 parts chlorine per million. Wash out with hot water the next morning before starting production.**
5. **All bottling equipment must be kept painted at all times, even when it is necessary to do "patch" painting.**
6. **Daily tests of quality and bacteriological content of finished product are required. Plant chemist also tests water, sirup and other ingredients. Tests are required, at least hourly, of proper carbonation of product.**

*The detergent used for flushing pipelines is Duponol "D", 0.5 oz. per gal. of water. The same detergent is used in Tank No. 1 of the bottle washer, where the concentration is 0.5 lb. per 100 gal., used along with the caustic soda.



MIXING MACHINE—mounted 6 in. off floor to insure easy cleaning underneath—mixes the carbonated water and sirup.



LABELING MACHINE, handling 175 bottles a minute, is held on adjustable legs about 6 in. above floor to facilitate cleaning.

tank through the caustic soda solutions until they reach Tank No. 5. Here they are subjected to a so-called "spindle rinsing" process. The bottles arrive on the washer internal conveyor, inverted above rows of vertical pipes that are automatically moved upward 6 to 8 in. into the bottles. Each spindle or riser carries a conical sprinkler head at the top, and when this comes to a standstill water at about 80 psi sprays into the bottle, thoroughly rinsing it in a few seconds. No brush is required. The water runs down out of the bottle into a collector pipe system which leads to the plant discharge lines, and this process is repeated through three additional stages of the rinsing section. The empty bottles are now sterile and pass to the outlet end of the washer unit. Here they are automatically received by a conveyor which carries them through a tunnel or hood with glass windows to the filling machine.

Use Ultraviolet Germicidal Lamps

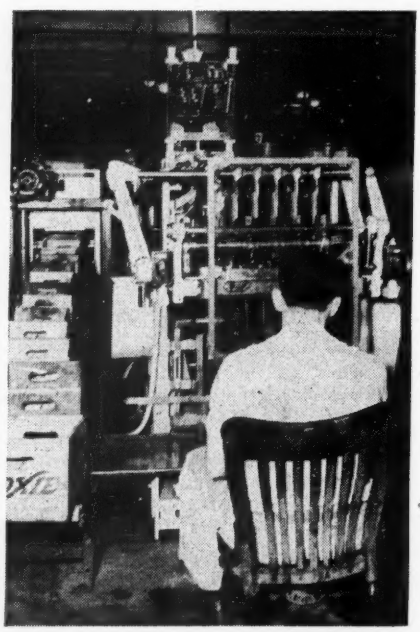
At the discharge end of the washer and mounted about 2 ft. above the moving bottles to the conveyor are two 36-in., 30-watt Sylvania germicidal ultraviolet lamps set in Sanitron anodyzed aluminum reflectors. These furnish bactericidal radiation upon the air and passing bottles. In the tunnel are one 15-watt and one 30-watt germicidal lamp. After a 45-deg. turn is made in the tunnel on the way to the filling machine, two 30-watt lamps are placed. In the tunnel section these lamps are mounted about 4 in. above the bottle line. Two other 15-watt germicidal lamps also sterilize the air at a star-wheel turn in the filling and crowning machinery. All germicidal lamps are controlled by a switch mounted near the discharge end of the washer unit. These lamps are started 30 min. ahead of the line to sterilize the air before starting production.

All sterilizing lamps are, of course, concealed from the vision of the attendants to insure complete eye protection. Cost of operating the germicidal lamps in the bottling department is estimated at not over 25 cents per day, the total connected load being 195 watts. By bacterial plate counts, the efficiency of sterilization is 99.99 percent. The lamp life is about 4,000 hrs.

After leaving the washer the bottles are filled automatically with the proper amount of flavoring sirup and carbonated cold water at the stainless steel 50-spout filling machine.

Motor Requirements

It takes 14 motors, totaling 88 horsepower, to operate this department. Sizes range from 1/3 hp. on the bottle feeder to 60 hp. on the Freon compressor.



AUTOMATIC CASER puts 24 bottles into cases at each movement. Mirror tells operator if lines of bottles have gaps or are full.

Buy Liquid CO_2 in Bulk

Carbon dioxide gas is delivered to the plant by tank trucks which pump it into a pipe line extending outside the building and leading to a Liquiflow receiver of 8 tons capacity within. Instead of receiving gas brought in cylinders at about 900 psi, the plant takes in the CO_2 at about 300 psi in much the same manner as a heating plant receives fuel oil. A refrigerating plant with a Worthington compressor employing Freon gas as the compressed medium, and driven by a 60-hp. motor, provides the cooling service for the filling department. This has a capacity of 1,400 gals. per hr. with a temperature reduction from 75 to 35 deg. F. The CO_2 passes from the Liquiflow receiver to the refrigerating unit and thence to the carbonator, where it meets the Permutit treated city water supply on its way to the filling machine. An automatically operated auxiliary steam connection is provided to heat the CO_2 in case it becomes too

(*Continued on page* 205)

EDITORIALS

LAURENCE V. BURTON, Editor

Those Annual Reports

EDITORS are supposed to be cynics, know all, and never be misled. So, when Corn Products Refining Company and Borden Company chided us for omitting their names from the food processors cited by *Financial World* for modernized annual reports (page 69, September FOOD INDUSTRIES), we were chagrined to learn that we were gullible —like ordinary people. We had assumed that a news story, sent to us by *Financial World,* told the whole story, whereas it proved afterwards to be only part of the story.

Financial World, like many others, makes an arbitrary distinction between Foods (Packaged) and Other Foods. The list sent us covered only firms in the first category. There seems to be no logical basis for listing Hunt Foods under Foods, Packaged, and Beatrice Foods under Dairy Products, or Beechnut Packing Company under Confections.

Anyhow, a new and different list of corporations is now submitted to us. Of this list, the food processors that received the awards on October 10 for their 1946 anuual reports are given below.

Industry Classification	Winner	2nd Best	3rd Best
Baking	Sunshine Biscuit	Carr-Cons. Biscuit	Burry Biscuit
Brewing	National Breweries	Pfeiffer	G. Heilman
Carbonated Beverages	Canada Dry	Dr. Pepper	Pepsi-Cola
Confections	Amer. Chicle	Sweets Co. of Amer.	Beechnut
Dairy Products	Borden	Nat'l Dairy Prod.	Beatrice Foods
Foods (Packaged)	Gen. Foods	A. E. Staley	Hunt Foods
Meat Packing	Swift & Co.	Cudahy	Armour
Milling	Gen. Mills	Pillsbury	Allied Mills
Sugar	American Sugar	Godchaux	Nat'l Sugar

If your name is not here, or you do not agree with the classifications, remember that the list is *Financial World's.*

Food Outlook—A Speculation

FOOD will probably be relatively scarce in the year 1948, even in U. S. A. where we shall produce plenty. Production is expected to be reasonably near to our domestic needs, but what we shall produce must be shared with our less fortunate neighbors.

After hitting the jackpot of agricultural production for about five or six years in a row, 1947 was a relatively poor crop year, especially for corn, and all that a corn shortage entails. The weather was at fault. After the extremely wet spring—so wet that planting was greatly delayed—came the long dry spell. The results we now know.

Will 1948 repeat 1947, or will next year be a normal crop year? There's a question that people all over the world would like to see answered.

Why one year's weather pattern should differ materially from another has long been a subject for speculation. For a number of years it has been believed that cosmic forces of great magnitude have the effect of changing the movements of what meteorologists call cyclones and anticyclones from one general pattern to another of a different sort. Such an external force could be the amount of radiated energy of the sun which, according to the publications of the Smithsonian Institution, varies considerably from time to time. The amount of the measurable variation is sometimes as much as 1.5 percent above or below the average. In recent years it has been considerably above average.

It would seem as if a variation from above average to below average must have become effective in 1947, judging by the complete change of the weather pattern all over the world. Yet, according to calculations made by Dr. C. G. Abbot of the Smithsonian Institution, the change is expected to last for only about a year. If true, then 1948 should be an average crop year.

While one cannot safely base any business plans on such untested research findings, we suggest that the subject be watched. Some day the accurate long range weather forecast will become a reality. In the meantime, for the sake of hungry humanity, let us hope that non-perishable food production in 1948 will be adequate for the international demands on this nation.

Let's Stop This Waste

"WASTED technical skills" is the subject of an American Chemical Society survey of wartime utilization of chemists and chemical engineers in the Armed Forces, that FOOD INDUSTRIES applauds. The wastage amounted to 40 percent.

The same or worse wastage of the skills of food technologists also occurred in the Forces. We speak from first-hand knowledge. Furthermore we have had a chance to sound off at the Army War College about this wastage.

The National Roster of Scientific and Specialized Personnel failed in 1941 to include the food technologist, presumably because of the erroneous belief that membership in the American Chemical Society would be adequate to bring to light the identity of all these specialists. The Roster was a miserable failure in this respect.

Next gripe is about the inability of certain minds in high places in the War Department to comprehend the difference between food technology and chemistry. A cement mill chemist, for example, may be a grand chap and very willing and able, but usually he knows nothing about food. And in the midst of a war it is no time to pull him out of combat to train him for food technology. Nor do we believe it is desirable to turn a brilliant young Ph.D. biochemist into a corporal of Military Police.

One time, as an adviser to the Quartermaster

General, we were asked to locate a man with certain qualifications. He was in uniform at Camp Lee, the Quartermaster training camp, but he could not be assigned to duty in the packaging section of subsistence branch. Too much brass stood in the way.

We hope the Institute of Food Technologists, as well as the American Chemical Society, gets into this fray and forces the adoption of a plan to use men at their maximum skills in defense of their country.

Undemocratic?

AMERICA is not the only place where labor is rebellious over the introduction of new legislation to curb industrial strife. New Zealand, which has heretofore been a union paradise, has had enough. In August its Parliament was engaged in enacting reform legislation. One aspect—the compulsory secret ballot before strikes—has drawn a violent protest from waterside (longshoremen) and transport workers. The union executives consider this as "undemocratic."

Sounds like the Moscow influence to us.

A Modern Fairy Tale

ONCE upon a time there was a man who claimed he had so many academic degrees from European universities and talked a scientific jargon so difficult for a layman to comprehend that Mr. Big was greatly impressed. For Mr. Big had apparently forgotten that a truly great scientist can speak words that a business man can understand.

Mr. Big was particularly interested because the European scientist had a new preservative. It would do things no ordinary American food technologist considered possible. It would preserve anything and do it without leaving a trace. If this new preservative were used there was no need to bother about the Food and Drug Administration. The new preservative was—shhhh, don't you dare tell a soul—helium. Americans were too benighted to know anything about it. This was fundamental. Americans are only adapters.

Mr. Big pressed all the buttons—but, pshaw! You surely don't want to hear the rest of the painful episode—or do you?

Time for Aggressive Action

THE recent National Conference on Weights and Measures elected to discuss the need for a new system of net weight declarations on frozen food and dried fruit packages. Frozen foods, say they, should be sold by the net drained weight. Any liquid present also should be expressed on the label in terms of liquid measure. This applies to gravies, juice, sirup or water other than that which adheres by molecular attraction. Pre-cooked frozen foods, such as beef stew, would thus be singled out for special designation.

Dried fruits, according to a resolution, should be labeled with net weight only, and added moisture should not be recognized.

One wonders just where the authority of Food and Drug Administration ends and where the Weights and Measures boys get that way. In any such conflict of authority the food processor is the one who gets hurt. Probably some deserve to get hurt, but conflicting jurisdiction is going to inflict unnecessary costs on many honorable processors.

Isn't it time for aggressive action? The various trade groups involved should press Food & Drug Administration for adoption of Definitions and Standards of Identity for the fabricated foods of which the Weights and Measures boys complain.

This positive action is the best way to clarify what may become a very confusing situation. But, one must be sensible about it. Unless the food industry group is prepared to recommend Definitions and Standards of Identity based on its own researches, then it must accept the government's proposals.

If industry is ready with data, this is the time to press F&DA for action. If no data is available, industry had better get busy; also pray that no hearings are called before the data and recommendations are prepared.

Annual Dividend "Down the Sewer"

ACCURATE and competent analysis of certain operations around a factory often reveals facts of great importance. And, too frequently, these facts are completely overlooked.

Take filling machines, for example. Time was when filling was done in a slipshod manner, especially before the day of accurate packing or check weighing scales. One company lost about two carloads of product a month by running ⅛ oz. overweight on each package in the good old days.

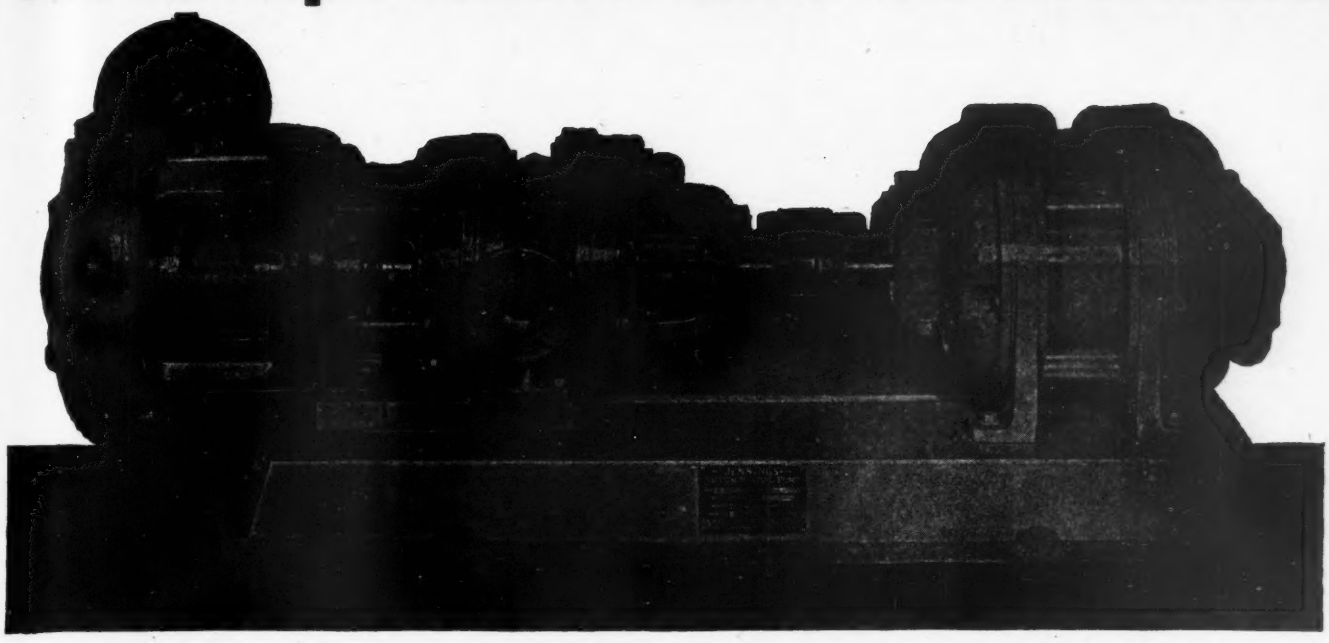
Yes, that was 25 years ago. We are smarter today and all our machinery is up to date. None of that old stuff today. Says you?

Well, fancy our surprise when a competent engineer in a very efficient company reported a restudy of filling operations. The upshot of his finding was that if all filling was as efficient as the most efficient filling job in his company, the saving would equal the annual dividends on the company's common shares.

The losses were little dribbles and spills, which, plus slight overfills, were never enough to attract attention, but when multiplied by the number of machines, and the number of operating days a year turned out to be an astonishingly large figure.

Most industrial wastage is not easy to identify. But persistent studies should reveal where things go, whether it be material balances, heat balances, improper cost accounting or downright dishonesty. With the potential as big as the annual dividend it is worthy of the entire time of a good man.

Nash—the Perfected Vacuum Pump for Evaporators and Condensers



COMBINATION VACUUM REMOVAL UNIT ESPECIALLY DESIGNED FOR SATISFACTORY OPERATION ON CONDENSERS WITHOUT BAROMETRIC LEG

Especially designed for drawing air and liquid from high vacuums, the Nash Vacuum Removal Unit is an efficient combination of a standard Nash Vacuum Pump and a Jennings Centrifugal. This design may be had in either motor or steam turbine drive, and may be installed with confidence that it will operate perfectly.

Nash Vacuum Pumps for Evaporator and Condenser Service offer unusual advantages. Vacuum is non-pulsating, producing uniform operating conditions and assuring a better product. Nash Vacuum Pumps have no valves, gears, pistons, rings, or mechanical complications. The single moving element rotates without metallic contact, and no internal lubrication is required. In standard design these pumps maintain vacuums up to 27" of mercury.

Nash Pumps are compact, and require but a fraction of the space taken by old type equipment. They may be installed where convenient, and they operate at suitable speeds for direct connection to either electric motors or steam turbines. Nash engineers will be glad to recommend proper equipment to exactly meet your particular requirements.

THE NASH VACUUM REMOVAL UNIT MAY BE HAD EQUIPPED WITH STEAM TURBINE DRIVE WHERE THIS TYPE IS PREFERRED

NASH ENGINEERING COMPANY

SOUTH NORWALK • CONNECTICUT, U. S. A.

NEW PACKAGES & PRODUCTS

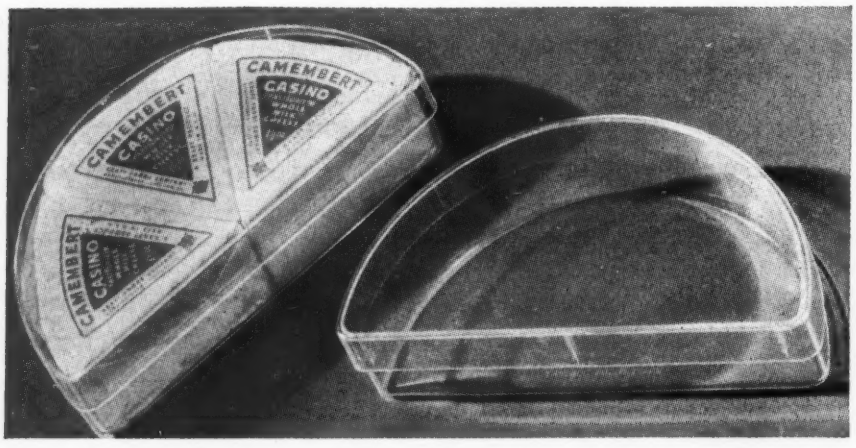
New Milk Cartons Are Distinctive and Entertaining

AWARENESS that there was a definite need for modernization of designs on fiber milk container labels has prompted Bowman Dairy Co., Chicago, to pep up its labels considerably.

The revamping job was done by the art department of American Can Co.

The main design feature of the new label is a band encircling each container which varies in color to identify the product. Through the middle of the band runs the Bowman name in a deep shade of maroon with the large logotyped "B" extending above and below. In cartoon style Bud Bowman is depicted above the band and a strip of scenery at the bottom represents the country and its fresh milk supply on one side and the city served by Bowman on the other side of the carton.

The family identity supplied by this distinctive new design aids in ready consumer identification of the entire line.



Re-usable Container for Fancy Cheese

CASINO Brand Camembert cheese, manufactured by the Kraft Foods Co., Chicago, now appears in a transparent plastic container designed to double as a trinket box.

Developed in cooperation with the technical service department of the Monsanto Chemical Co., the container is made of clear polystyrene and is being produced for Kraft by the plastics division of the General American Transportation Co., Chicago.

Because the material is transparent the contents are easily visible. The container retains the half moon shape, holding three individually wrapped cheese wedges.

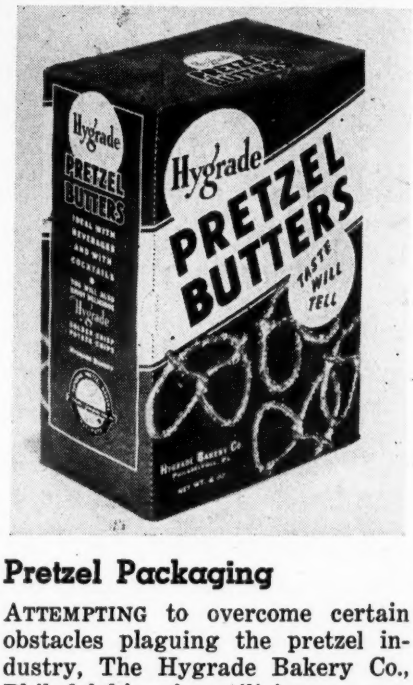
More Mor

RECENT additions to products packed under the Mor label are beef, lamb and veal luncheon meats.

Already introduced in approximately half of the branch house cities of Wilson & Co., the Chicago packer, the new meat trio will soon be distributed on a national scale.

The meats, seasoned and cooked, are packed in 12 oz. cans and may be used either for main meal dishes or for light snacks and sandwiches.

The can is square so that when the packed meat is cut, two slices exactly cover the average slice of bread. A key-opener is supplied.



Pretzel Packaging

ATTEMPTING to overcome certain obstacles plaguing the pretzel industry, The Hygrade Bakery Co., Philadelphia, is utilizing a new package for its round shaped twisted pretzels.

The wrap resulted from the necessity for a pretzel package free from breakage and one that would retain the pretzels' original bakery freshness.

These objectives have been attained by specially adapted machinery made by Triangle Machinery Co. and Peters Machinery Co., and triple package protection afforded by a waxed glassine liner, a modernized container and a waxed parchment overwrap.

The pretzels are automatically scaled and eased into the box, which then passes through a box closer and is finally overwrapped.

Hygrade Pretzel Butters are now being effectively marketed on a nation-wide scale for the first time by virtue of this manner of packaging.

They Mix You Pie and Fudge—You Heat and Eat It

THREE products recently have joined the ranks of the 7-Minit family, manufactured by 6-O'Clock Foods, Inc., Norristown, Pa. These comprise a chocolate flavored fudge mix, a complete lemon pie and a complete chocolate pie, including crust and filling.

In preparing fudge with 7-Minit Fudge Mix, all the housewife adds is butter and water. Actual cooking time is four minutes.

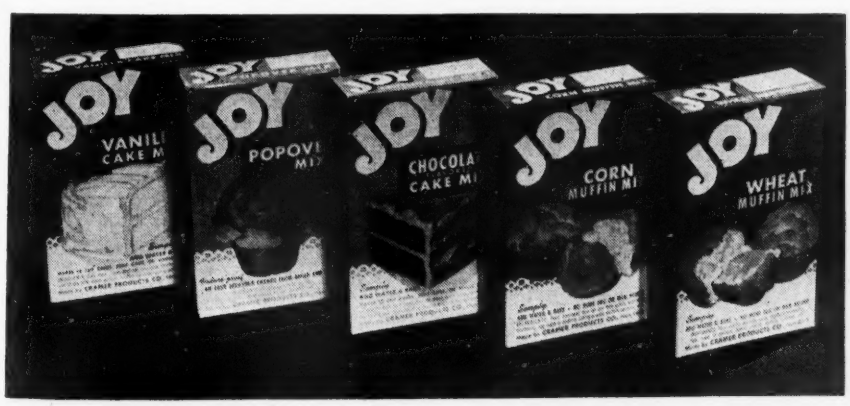
An innovation is a paper measuring cup included in each box for measuring the exact amount of water, eliminating guesswork.

Developed during the war, the two complete pies had to attain highest standards of quality and perfection before production was begun.

The lemon filling consists of a powder and a capsule which contains the lemon oil. Sugar, water and one egg are to be added during cooking. The pie crust mix is the same one that the company has manufactured for some time.

Ingredients of the complete chocolate pie include flour, shortening, corn starch, cocoa, salt, baking powder and artificial flavoring. In preparing, it is necessary to add about ½ cup of sugar as well as 2½ cups of milk.

The 8 oz. packages make 9 inch pies. All cartons have been designed similarly, the lemon pie done up in blue, the chocolate pie in brown and the fudge mix in red. A large white 7 is used to carry out the 7-Minit theme and there is a colored reproduction of the finished product on each carton. The fudge mix package features fudge on one side and cake icing mix on the other, giving the effect of two separate products.



These Cartons Bring Joy to the Housewife

CRAMER PRODUCTS CO., New York, is displaying its baking mixes in newly designed cartons.

Making a striking group on grocery shelves are Joy Corn Muffin Mix in bright red, Popover Mix in cerise, Vanilla Cake Mix in green, Chocolate Flavored Cake Mix in orange and Wheat Muffin Mix in royal blue.

Each package carries a colorful picture of the baked product.

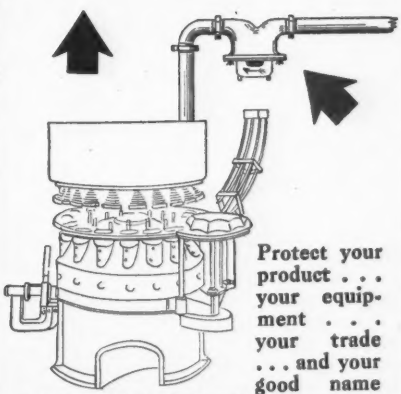
Directions and ingredient information have been confined to a white band running around the lower portion of the carton and to the panel on the back.

The Joy name and product identification appear on all six box surfaces.

Take no Chances with NAILS NUTS and other Tramp Metal in your canning line

Here is one day's trouble-shooting with a

"CESCO" MAGNETIC TRAP



Protect your product . . . your equipment . . . your trade . . . and your good name with CESCO Magnetic equipment.

Illustration shows CESCO Magnetic Trap installed in filler line to insure absence of tramp iron in finished product.

CESCO Magnetic Plates and Traps can be installed anywhere in the line to protect either liquids or solids. Made with Alnico Magnets, licensed under General Electric Co. patents. No electricity required.

Write for illustrated Folder, or see your nearest distributor branch.

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FOOD MACHINERY CORP.

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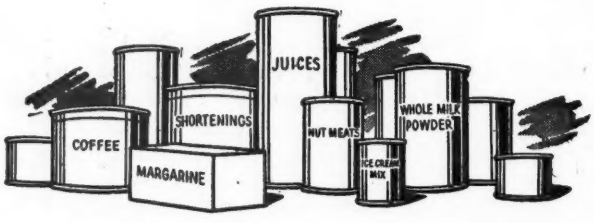
Linde

NITROGEN

HIGH-PURITY—99.99% PURE



Quality Packed They stay that way because they are processed and packed with LINDE High-Purity Nitrogen.

LINDE Nitrogen, 99.99% pure, is available in many locations—in any quantity. It is supplied in tank-truck and tank-car lots as a liquid which is converted to gaseous nitrogen as required, or as a compressed gas in 224 cu. ft. cylinders.

Let us show you, through Linde's Engineering Service, how you can protect the quality of your product by using LINDE High-Purity Nitrogen in manufacturing, shipping, and packaging. Just call or write any Linde office.

THE WORD *Linde* IS A TRADE-MARK

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In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto

Back Again!
MINUTE TAPIOCA
Now again enjoy Tapioca Desserts! Delicious-Economical
See Recipe on Back.
MAKES 36 SERVINGS
8 OUNCES · NET WEIGHT · 227 GRAMS
MANUFACTURED BY GENERAL FOODS CORPORATION
ADDRESS: NEW YORK, N.Y. MADE IN U.S.A.

Welcome Back

GENERAL FOODS CORP., New York, has welcomed back into the fold its Minute Tapioca, absent from grocery shelves during the war.

Prior to the war and for many years, the tapioca flour was imported from Java, although actually the plant is native to Brazil and had been transplanted to the East Indian areas of Singapore and Java. So General Foods has turned to Brazil as the chief source for its postwar tapioca product.

Quality is said to compare favorably with prewar standards and the company expects production to improve and shipments to arrive in ever growing quantities, insuring adequate supplies of Minute Tapioca throughout the U. S. early in 1948.

Minute Tapioca has been manufactured in Orange, Mass., since 1894.

Foil for Coffee

DEALERS who sell coffee roasted by the new electronic Infra Roast method will package the product in aluminum foil bags, according to August S. Torres, president of Infra Roast Inc., Boston.

The bags, produced by Reynolds Metals Co., Richmond, Va., are designed to prolong the freshness during the time that the coffee remains packaged in the home. The containers are lined with waxed paper fillers and equipped with a roll-down clamping top to help retain the fresh coffee flavor.

The Infra Roast process entails roasting the coffee electronically at the time of purchase to maintain

MORE POWERFUL GERMICIDE

Roccal
Reg. U. S. Pat. Off. and Canada
BRAND
SANITIZING AGENT

Here is the revolutionary new sanitizing agent that meets Food Packers' needs . . . it's ROCCAL! A more powerful germ killer . . . yet perfectly *safe!* Easy to use. Economical. ROCCAL kills germs. It inhibits growth of molds, slimes and algae.

In recommended dilutions, ROCCAL is non-poisonous, virtually odorless and tasteless. It is non-corrosive . . . will not injure metal or fabrics. Does not irritate the skin. Solve your sanitation problems today . . . get ROCCAL.

Sample and literature on request.

FOOD PROCESSING PLANTS

Keeps equipment and storage areas sanitary. Inhibits growth of molds and slime-formers.

COLD STORAGE AND LOCKER PLANTS

Reduces spoilage losses by keeping refrigerators and lockers sanitary. Does not affect odor or taste of food.

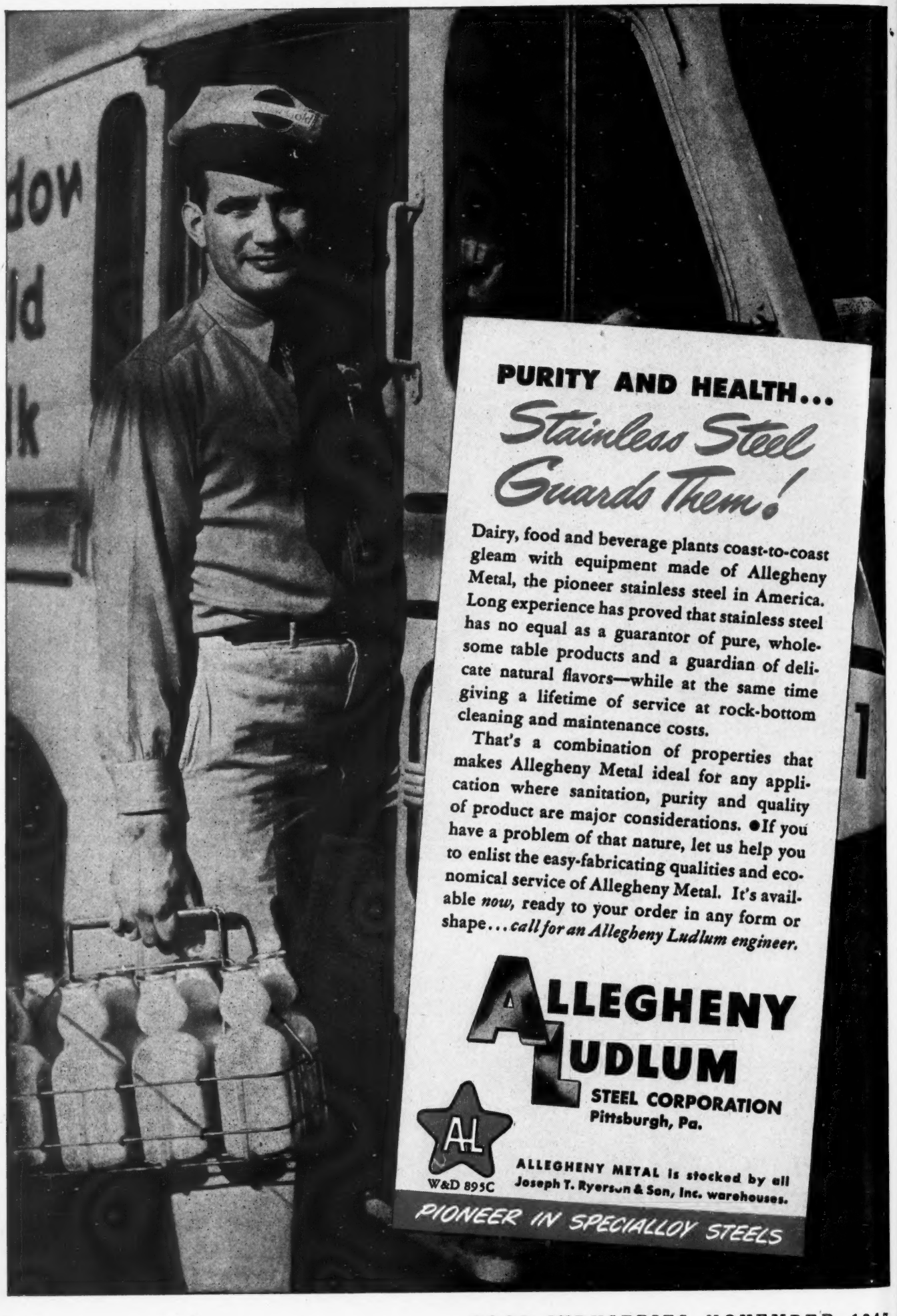
FISHERIES AND FISH PACKERS

For sanitizing storage areas of fishing boats and canneries, filet machines, shrimp deveiners, etc.

Industrial Division

WINTHROP CHEMICAL COMPANY INC.

Dept. W-117, 1450 Broadway, New York 13, N. Y.


PURITY AND HEALTH...
Stainless Steel Guards Them!
Dairy, food and beverage plants coast-to-coast gleam with equipment made of Allegheny Metal, the pioneer stainless steel in America. Long experience has proved that stainless steel has no equal as a guarantor of pure, wholesome table products and a guardian of delicate natural flavors—while at the same time giving a lifetime of service at rock-bottom cleaning and maintenance costs.
That's a combination of properties that makes Allegheny Metal ideal for any application where sanitation, purity and quality of product are major considerations. ●If you have a problem of that nature, let us help you to enlist the easy-fabricating qualities and economical service of Allegheny Metal. It's available *now*, ready to your order in any form or shape... *call for an Allegheny Ludlum engineer.*
ALLEGHENY LUDLUM STEEL CORPORATION
Pittsburgh, Pa.
A-L
W&D 895C
ALLEGHENY METAL is stocked by all Joseph T. Ryerson & Son, Inc. warehouses.
PIONEER IN SPECIALLOY STEELS

fuller flavor for a longer period of time.

Because of the decrease in weight loss over the usual method, the retailer can sell more prepared coffee per pound of green beans purchased.

Here Comes Cookie

Two additions to the Burry line of biscuits and crackers are Charm House Cookies and Creamy Way Cookies.

The former is a chocolate chip with nut meats. Ingredients include flour, sugar, shortening, artificial flavoring, leavening and salt.

Burry Biscuit Co., Elizabeth, N. J., the baker, has chosen a distinguished package design for both these new items. Charm House Cookies are wrapped in a medium blue with full color reproduction of the chocolate chip cookies. The labels in each case are uncluttered and smart in appearance. Burry uses waxed paper between the carton and the outer wrap to prevent grease seepage.

Creamy Way Cookies are molded with a hole in the center, each cookie carrying the name. This product is made with flour, sugar, shortening, corn flour, skim milk solids, condensed milk, salt, leavening, lecithin and artificial flavoring.

Dark blue is used for a background color here with a milky way effect of white stars.

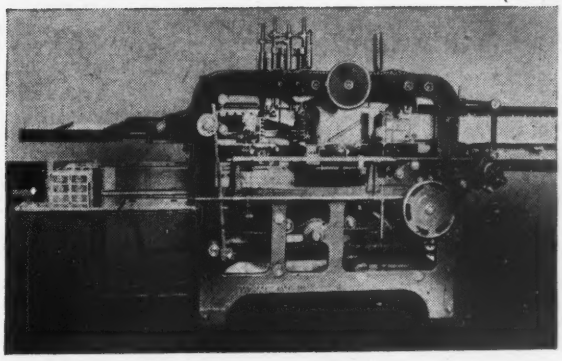
Kentucky Scrapple

EXPANDING its line of Southern Style delicacies, Morton Packing Co., Louisville, Ky., has introduced Chicken Giblet Scrapple, designed to provide the meat demanded by so many consumers.

Packed in a colorful 10½ oz. can, the scrapple serves equally well with bacon, eggs, potatoes, sirup or jelly.

Corn meal and giblets form the major portion of the pack.

MODEL F-10
BUNDLING MACHINE



Save WITH MACHINE BUNDLING

on Labor...Materials...Storage Costs...Shipping Costs

Machine bundling is being used by more and more concerns because of the striking savings it makes over packing goods in costly made-to-order boxes.

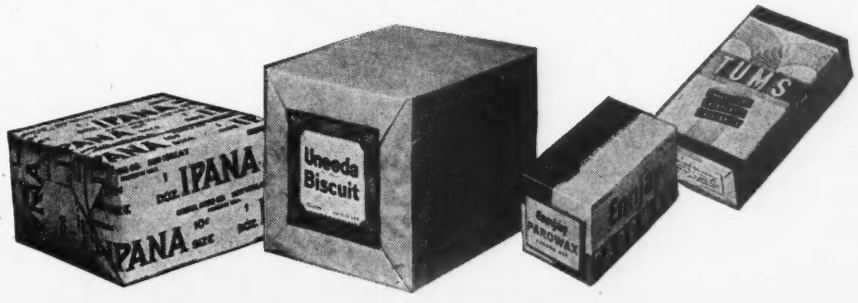
The machine will bundle a dozen, or any desired number of cartons coming within its size range, and is adjustable for bundles of different sizes. It is suited not only to products in cartons, but also to products in tubes and bottles which are inserted in cartons. A "collector" can be supplied to assemble the packages in a variety of groupings — one, two or three layers.

Using tough kraft paper, firmly sealed, the machine makes a bundle that is surprisingly strong. Printed end-labels are attached automatically.

Savings on packing material alone run as high as 60%, and the labor savings amount to thousands of dollars annually. Being lighter than cardboard, the bundle costs far less to ship. Less space is needed for storing rolls of paper than is required for bulky boxes. And since one machine will make 8 to 24 bundles per minute, depending on size, there is also a saving in factory space formerly required for hand packers.

Any way you look at it, machine bundling is a real money-saver. So why not investigate what it might mean to you? Our nearest office will be glad to furnish complete information.

PACKAGE MACHINERY COMPANY • Springfield 7, Massachusetts
NEW YORK CHICAGO CLEVELAND ATLANTA DENVER
LOS ANGELES SAN FRANCISCO TORONTO

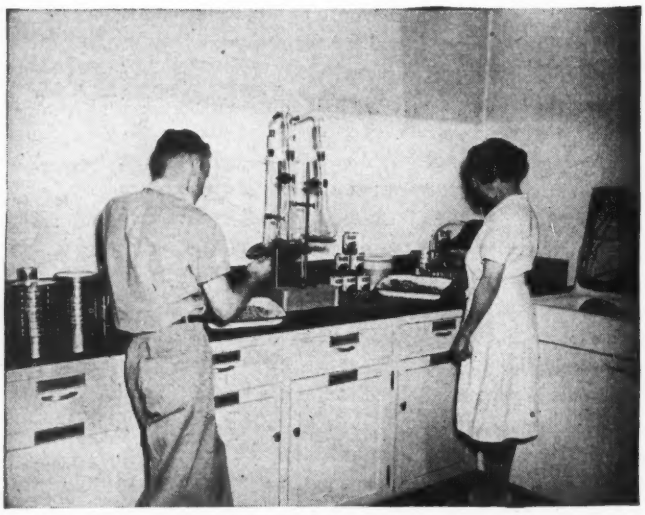


PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines

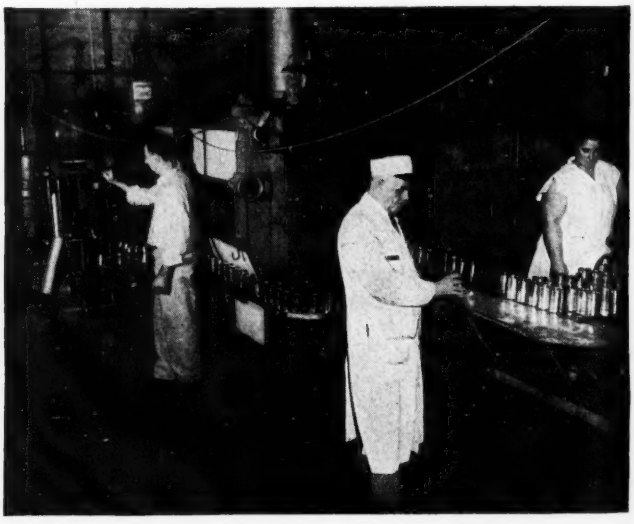
CANNERS LIKE CROWN SERVICE...

Otoe Celebrates Its Sixty-First Anniversary

Mr. Morton Steinhart (left), president of the Otoe Food Products Company, discussing plans for a new Otoe product with Frank A. Singler, Crown Can Sales Representative.

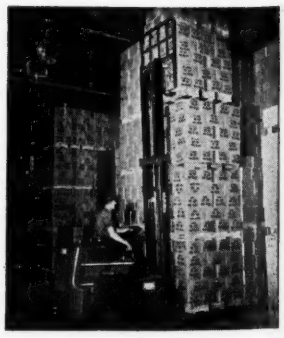


Otoe products are packed under strict laboratory control. Two Otoe laboratory technicians test spaghetti.



Otoe plant foreman inspects Morton House Date Roll line. Cecil Hartley (left) Crown field man checks equipment.

Otoe Food Products Company plant at Nebraska City. This is one of the largest and most modern canning plants in the Middle West. Otoe Food Products Company packs a diversified line of quality canned goods and the company has a long record of successful operation.



Modern loading equipment and high-ceilinged warehouses are part of the Otoe efficient operation.

ONE OF A SERIES FEATURING CROWN CAN CUSTOMERS

CROWN CAN

THE NATION'S THIRD LARGE SOURCE OF SUPPLY

CROWN CAN COMPANY • PHILADELPHIA • Baltimore • Chicago • St. Louis • Houston • Orlando • Fort Wayne • Nebraska City

FOOD INDUSTRY NEWS

DEVELOPMENTS IN DISTRIBUTION

Widespread Attention Given Packaging in Recent Months

Developments run the gamut from lightweight crates for oranges to vacuum packages for other food products

PACKAGING developments all along the food front, in recent weeks, indicate a high paced activity that promises improved distribution in the very near future. Outstanding among these are the Florida packers' use of aluminum crates for fresh oranges, American Can's research on vacuum gas packing and on their use of synthetic rubber in can sealing, and vacuumized flexible packaging.

Reynolds Metals Co. has set out to overcome last year's setback, when wrong specifications forced the company to call in the 12,000 lightweight crates with which they had hoped to win over the industry. The crate has now been designed to the same specifications as the wood crate.

American Can claims excellent results from the use of vacuum-gas packing method for preserving dry foods. The method removes atmospheric gases from a filled container by vacuum, after which the vacuum is dissipated with an inert gas—nitrogen and carbon dioxide, used separately or in combination. The container is then hermetically sealed. The method, according to Canco, is chiefly effective in preserving flavor, aroma, appearance, taste and nutritive value of foods that are subject to oxidation. Whole milk powder, dry milk base baby foods, whole egg powder, nutmeats, potato sticks, dehydrated cabbage, cereal flour and popcorn are cited among the foods successfully preserved by this method for the Army and Navy.

Canco also claims better protection for canned products has resulted from the use of synthetic rubber sealing compounds. Different compounds are used depending upon the product and the type of resistance required.

In the field of vacuumized flexible packages, Flex-Vac flexible laminated bags are being tested by Standard Cap & Seal Corp., their manufacturer. A Cellophane-Pliofilm bag for fresh sliced bacon has gotten as far as market testing by Armour & Co., while experiments are being made for frankfurters, peanuts, frozen fish and natural cheese. Standard Cap & Seal is also developing a vacuum packaging machine to pack coffee.

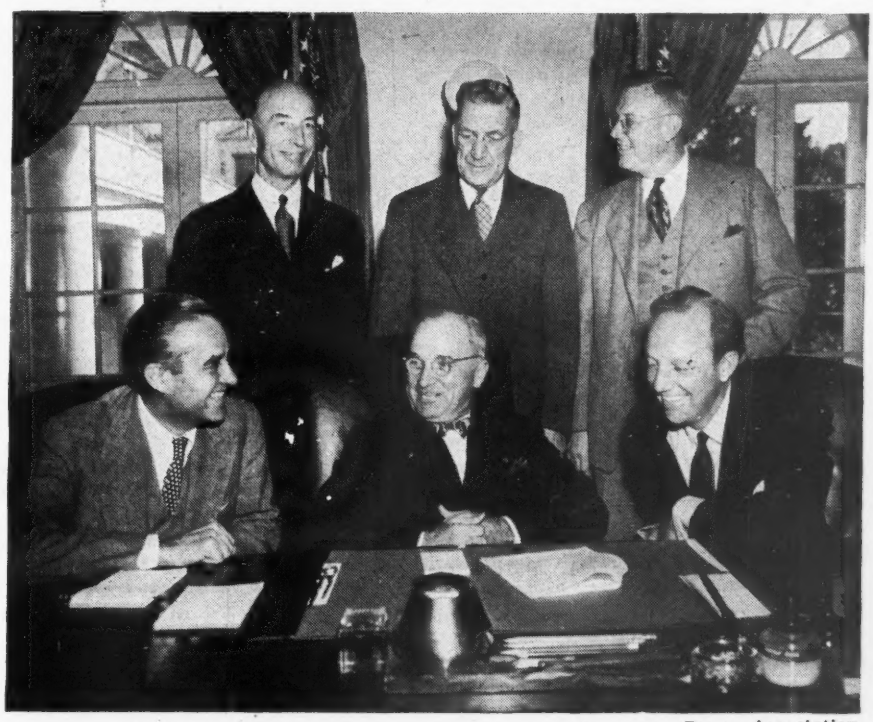
Packaging Institute Plans Lively Meeting

NEW packaging products and new methods, together with full length discussions of the packaging problems of particular industries, will hold the spotlight at the ninth annual meeting of the Packaging Institute, scheduled for the Commodore Hotel, New York City, November 18 and 19.

The first general session, which will be devoted to a resume of significant new developments in the packaging field, will be headed by G. W. Reese, American Can Co. This meeting will be followed by an outline of advances in packaging in Sweden and Australia, as observed by Francis Chilson, prominent engineer, who has just returned from those areas.

Two of the seminars of particular interest to the food industry are those of the brewing and distilling industries and of the combined foods, confectionery and tobacco industries. Both are scheduled for the morning of November 19. The brewers' group will be led by Dr. Ralph I. Claassen, Hiram Walker & Sons, while the combined foods seminar will have A. B. Brackett, General Foods Corp., in the chair.

The five-man program committee, under the leadership of W. O. Brewer, Calco Chemical Co., announced in mid-October that their plans for the gathering were practically completed.



Press Association

FOOD CONSERVATION COMMITTEE

Members of the cabinet food committee discuss the President's food conservation program at an early White House meeting. Chairman Charles Luckman is at the President's right. At the left is W. Averell Harriman, Secretary of Commerce, and standing are from left Under Secretary of State Robert A. Lovett, Under Secretary of Agriculture Norris E. Dodd and Presidential Assistant John R. Steelman.

Food Research Program Shows Rapid Development Under R & M

OUT of a total of 50 research projects announced by the Research and Marketing Administration as of October 1, about one-third bear on the technology or marketing of foodstuffs.

Among those approved are projects in the following fields: Meat processing; refrigeration of fruits, vegetables, milk and cream; utilization of milk and whey; packaging of fruits, vegetables and eggs; spoilage in shipping; stimulating foreign demand; reducing losses in eggs and meats; and economic studies of demand for food and food requirements (see accompanying list).

The amount of money allocated to individual projects ranges from $10,000 to $75,000. By mid-October, A. E. Meyer, administrator of the program, expects to have allocated $5,500,000 to the 150-175 projects to be financed by this year's program.

USDA, under the terms of the Research and Marketing Act of 1946, has $7,000,000 for research, out of the total of $9,000,000 appropriated by Congress. With $5,500,000 allocated to specific projects and $2,000,000 already allocated to state research laboratories under the terms of the act, the balance will be divided as follows: (a) About $500,000 will be used to contract a dozen projects to non-government organizations; (b) the remainder will be held for emergencies (research that might come under the Marshall Plan proposals, for instance), and for projects that will require additional funds this fiscal year to carry out their assignments. Of the total, about $200,000 will go for administration.

The 11-man national advisory committee to Meyer met the first week in October to hear progress reports and plans for the future by the agriculture men who are directing the program. About 80 projects were expected to be approved.

Before January 1, each industry and commodity advisory committee will be called to Washington to go over the projects in detail, to hear progress reports and to suggest work to be done during the 1947-48 year. Also, committee members will be asked specifically to make suggestions in view of changing world conditions, such as demands on U. S. food and agriculture made by the Marshall Plan.

As a follow-up on each of the projects to be finally approved, Meyer will suggest that each commodity committee nominate men to keep in close touch with individual projects. For instance, a soybean processor from Illinois might be named to keep in touch with a soybean project at the USDA regional laboratory in Peoria.

Food Processing Research and Marketing Projects (Approved as of October 3)

Meat Processing

Project: Develop methods to prevent deterioration in quality and nutritive value of meat during processing, storage and distribution. Tests to be made on samples of meat from packers, freezer locker plants, curing plants and farmers.

Refrigerating Fruits And Vegetables

Project: Study pre-cooling of produce to be shipped fresh: Determine advantages of prompt and continuous cooling of produce from time it is harvested until canned or frozen; analyze different methods of refrigeration; gather information on losses due to wilting and shrinkage. Kansas City, Mo., to be principal market center for study.

Freezing and Refrigerating Milk and Cream

Project: Develop improved methods of freezing and refrigerating milk and cream without loss of fresh quality, fresh flavor.

Reducing Egg Losses

Project: Reduce losses during handling, processing, packing, transporting and warehousing; study causes of breakage and quality loss, and where they occur; determine characteristics of cartons and cases best suited for eggs.

Food Needed by Population Groups

Project: Determine kinds and quantities of food needed by individuals according to age, sex, occupational activity.

Utilization of Skim Milk and Whey

Projects: (1) Develop new processes for using more skim milk and whey in both domestic and foreign-type cheese. (2) Find wider use for milk and byproducts in evaporated, condensed and dried milk, and other food products.

Pre-Packaging Fruits And Vegetables

Project: Determine whether pre-packaging is best done at point where produce is grown or at terminal facilities; investigate suitability of moisture-vapor proof, gasproof and porous plastic wrappings; evaluate methods of washing, trimming, refrigerating, shipping and displaying prepackaged produce.

Spoilage in Shipping Fruits and Vegetables

Project: Reduce losses during shipping caused by decay and spoilage; study effectiveness of fumigants, disinfectants and antiseptic washes; analyze types of containers, ventilation, refrigeration or heater service; determine effect of delays under various shipping conditions.

Uses and Prices of Fats and Oils

Project: Measure the major influences affecting prices and consumption of fats, oils and peanuts.

Prices and Uses of Meat Animals and Meat

Project: Determine and measure factors influencing changes in meat and meat animal production, prices, marketing and consumption.

Improvement of Consumption Data

Project: Tap food industry sources for trade information for use with government data to improve knowledge of demand and potential markets for farm food.

West Coast Citrus Lab.

Project: Construction and installation of necessary equipment of citrus fruit laboratory at Pasadena, Calif. Upon completion, in about a year, the laboratory will engage in research to determine causes of flavor change in citrus juices after processing, methods of freezing citrus juice and methods of retaining color and flavor in single-strength canned orange and grapefruit juices.

Urge More Oranges Be Held for Canning

BECAUSE fewer oranges will be available this year, the Florida citrus industry's federal control committee recommends shipping fewer oranges for the fresh market, thus retaining a larger portion for processing.

"According to the data obtained by growers' administrative committee field estimators," said a committee report, "the 1947-48 production of Florida oranges currently on the trees is not only considerably less than the crop on the trees a year ago, but probably less than 52,800,000 boxes, or that portion of last season's freeze-depleted crop actually harvested and utilized.

"In the development of a marketing policy for the season, consideration has been given to indications that consumers not only utilized the millions of cases of processed oranges from the tremendous carryover of the previous season, but in addition will have consumed before processing is renewed in 1947-48 practically the entire record pack from the 1946-47 production. This promises to leave shelves relatively bare of Florida orange juice and to present to the industry the opportunity this season to expand the 1947-48 pack to a new record volume and materially reduce the quantity shipped fresh, and without creating a burdensome carryover of processed oranges into yet another season."

The committee said in the policy that they believed only 52 percent of early and mid-season oranges should be shipped in fresh form this season, compared to 57 percent last season. They said it appears advisable to ship 46 percent of Valencia oranges fresh this season, compared to about 50 percent this past season.

Government Sets Limit For Dried Fruit Buying

SECRETARY OF AGRICULTURE Clinton P. Anderson has revealed that Commodity Credit Corporation will purchase up to 133,000 tons of dried apples, dried peaches, dried prunes and raisins if the purchase of this total quantity of dried fruits is necessary to provide outlets for the relatively large 1947 production. The purchases will assist the industry in disposing of this expected surplus of supply and provide an excellent food for foreign relief feeding and school lunches.

The maximum limit of 133,000 tons is divided into purchase of 2,250 tons of dried apples, 3,750 tons of dried peaches, 61,000 tons of raisins, and 66,000 tons of dried prunes.

Purchases of the dried fruits under the program will be made from processors and packers of dried fruits. An announcement will be issued soon inviting packers to submit offers on a portion of the quantity to be purchased.

Most of the prunes procured by CCC will be of the 70/80, 80/90, and 90/100 sizes. Raisin purchases will be confined to the Thompson Seedless variety. The purchase program does not provide price support at any given level, but is expected to result in reasonable prices to producers and consumers.

Department officials stated that the program should enable the dried fruit industry to complete its plans for readjustment on a self-help basis. It was emphasized that government purchases should not be regarded as the permanent solution of dried fruit surplus problems.

Corn Products Producers Deny Price Conspiracy

THE 19 companies charged by the Federal Trade Commission with unlawful price discrimination and conspiracy to fix prices and suppress competition have filed answers with FTC denying any violation of the law.

The answers in general deny the complaint's allegations, which are directed chiefly against collusion in the quotation and support of price and terms and conditions of sale for such products as corn sirups, corn sugars, corn oils, dextrine and starches.

The companies also denied that they implemented their alleged conspiracy through the medium of four associations: Corn refiner statistical bureau, starch manufacturers' association, corn oil producers' association, and sirup mixers' society. These associations, according to the corn processors, were dissolved prior to September 30, 1946.

Soybean Oil Not Lost In Storage, USDA Reports

RESEARCH by the U. S. Department of Agriculture on the oil content of soybeans in storage shows that no oil is lost from beans during their storage prior to processing, contrary to the commonly held belief that such oil content diminishes during storage.

This and other results of research into both food and industrial uses of soybeans by the Bureau of

BECAUSE A FARMER LOST HIS *Pliers...*

• This story is short, tragic and typical. The farmer's lost pliers landed in a grain truck headed for the elevator. Dumped with grain into the mill elevator intake, the pliers struck a brace hard enough to spark and set off a dust explosion.

From the spark on, the story concerns only firemen and ambulances . . . Later, insurance adjustors — and planning the new mill. This time with magnetic separation protection.

Dings Magnetic Separators could have prevented this disaster by catching the tramp iron before it caused trouble. Separators not only prevent fires, they protect grinders, pulverizers and other machinery from damage by iron.

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Bag Closing Machines

Agricultural and Industrial Chemistry's Northern Regional Research Laboratory at Peoria, Ill., was reported by Dr. G. E. Hilbert, director of the laboratory, to the American Soybean Association.

The laboratory also has completed studies on utilization of soybeans as food for human beings. One study has established a scientific basis for the Chinese art of making soya sauce. The laboratory worked out an effective method for the fermentation of soybeans by a combination of molds, yeasts, and bacteria that can be depended on to yield a high-quality sauce. Strains of the microorganisms from the laboratory's culture collection are being made available to the industry.

Eggs Moving Freely Says Institute Head

"EGG stocks definitely are not being withheld from the consumer, as some groups have charged," said Dr. Cliff D. Carpenter, president of the Institute of American Poultry Industries, at a hearing before the Congressional Joint Committee in New York City recently.

"In fact," Dr. Carpenter stated, "eggs are moving out of refrigeration more rapidly today than they did during the 5-year period immediately preceding wartime controls. This is in spite of the fact that supplies of eggs in storage on September 1 this year were only 58 percent of pre-war average stocks. Look at the official storage inventory figures released by the U. S. Department of Agriculture; they prove beyond a shadow of a doubt that industry, far from hoarding eggs, is actually releasing them to consumers at a faster rate than usual."

In commenting on the dried egg market, Dr. Carpenter said we might as well face the fact that foreign demand has "dried up." He strongly urged the Department of Agriculture to establish a policy to govern the disposal of stock of eggs and poultry the government may own after the expiration of the Steagall amendment, Dec. 31, 1948. At present these eggs may not be sold on the domestic market at less than cost plus carrying charges.

"IT'S HOT WATER .... YOU JUST ADD COFFEE TO IT."

November Hearing For Salad Dressing Makers

Salad dressing standard of identity hearing has been scheduled by F&DA for November 17 in Washington. The proposed standards for mayonnaise, French dressing, and related salad dressings are outlined in the Federal Register for October 15.

Manufacturers and ingredient suppliers are being urged to make an adequate record for this meeting as later amendments are usually time consuming and costly.

Lawrence E. Bobker has been designated as presiding officer for the November 17 meeting.

Private Label Buyers Find Canners Scarce

SEVERAL of the Central States food wholesalers, and more especially those sponsoring voluntary and cooperative groups, are having difficulty in getting cooperation from canners in providing private label products. As a consequence, wholesalers stocks are badly spotted, with inventory lacking entirely in many fresh crop items, such, for example, as lima beans, kidney beans and sweet pickles.

The inference is that the larger national distributing food operators are getting the bulk of the cannery output this year. Some area wholesalers blame speculators for buying up entire outputs of many small packers. Others report that many of the larger packers are refusing pointblank to change labels on any processing run, thereby making it impossible for the smaller wholesaler or voluntary group sponsor to obtain lots under their own label suitable to their needs.

One large area wholesale house spokesman admitted that as a result his firm was being compelled to turn more and more to national brand distributors for many canned and processed items heretofore easily obtainable from packers willing to produce under their own private labels.

The effect this situation is having on one large well-known Indiana food distributor is to channel the thoughts of the organization toward entering the national field as a protection against merchandise shortages. The idea would probably embrace the purchase and operation of its own canning plants.

This procedure would guarantee the continuance of the firm's private brands of canned goods and probably give them sufficient surplus over the requirements of its

. . . but what about the toll you are paying to lime scale?

Bridge tolls are one thing, but there's no need to pay a toll to lime scale on every unit of your product that leaves the plant.

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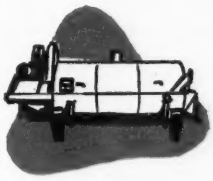

Take Blanchers, for example. A quick application of recommended solution of Oakite Compound No. 32 thoroughly dissolves insulating lime scale and rust. There's no time-wasting scraping and brushing. A cold water flush, then a metal-protecting neutralizing rinse—and blanchers are ready for production at efficient heat-transfer rates.

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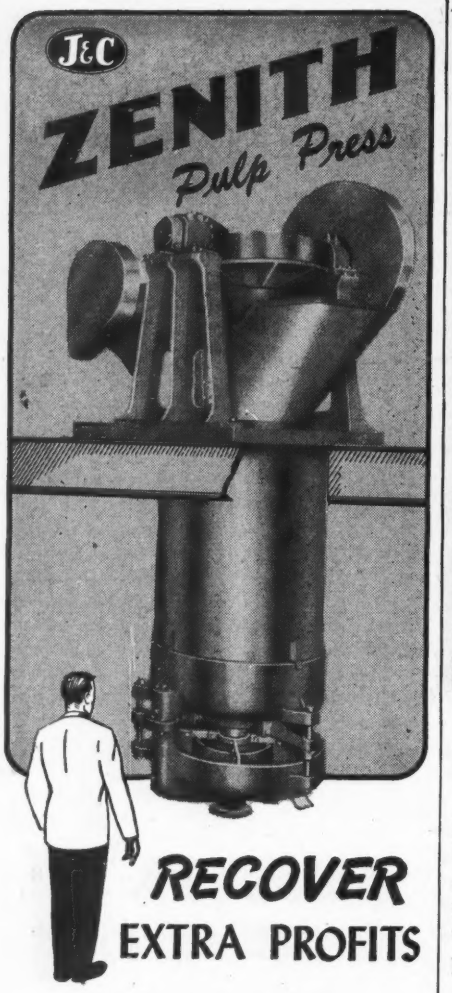

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100% continuous ... from storage bin to pressed cake, the Zenith Pulp Press dewaters up to 26 tons of wet pulp per hour.

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Constantly rolling pulp assures maximum dewatering. Heater resistors permit steam injection.

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SPEED UP UNLOADING OF FISH

The half million fish shown here were unloaded in less than an hour, by the Consolidated Fisheries, Lewes, Del., using a 12 in. vacuum hose to suck them from boat.

large voluntary group of retail outlets covering a wide section of the state, to place certain products on the national market, and back it up with a national advertising campaign.

Another area wholesale food distributor said he was certain the average wholesaler would continue to face shortages of many private label canned fruit and vegetable items for at least two to three years to come, barring the possibility of a sudden depression or at least a drastic slowing down of food exports to Europe.

In the meantime several large retail super markets in Indiana are preparing to drop all private label or wholesaler's brands and stock only the nationally advertised brands on their experience of faster sales volume in the nationally distributed products.

School Lunch Buying Totals $8,500,000

BY mid-October, the Department of Agriculture had expended $8,500,000 of a total of $11,000,000 available for its direct purchase and distribution of foods under the school lunch program. Foods already purchased include concentrated orange juice, dried skim milk, canned tomatoes, tomato juice and cheese. After the first of the year, it is anticipated that additional quantities of concentrated citrus juices and cheese will be bought.

Congress voted a total of $65,000,000 for school lunches, $48,750,000 of which has been apportioned out to the schools in the participating states, to be spent in purchasing foods locally. Last year's program provided $10,000,000 for the purchase of equipment in the schools; no funds were voted for this purpose in fiscal 1947-48. About 7,000,000 of the nation's 27,500,000 elementary and high school students will benefit from the program, according to department estimates.

One Milk Buyers' Survey Shows Glass Preferred

THE majority of American housewives prefer to buy milk in glass bottles at the grocery store, results of a recent national survey conducted by the Elmo Roper organization show.

A total of 65 percent of the housewives preferred store-purchased milk in glass bottles. Another 26.5 percent indicated preference for other type containers, while 8.5 percent answered that they did not know or it made no difference.

When asked why they prefer milk in glass bottles, 24.8 percent of the women who expressed preference for glass-packaged milk said that bottles are more sanitary, and 24.1 percent replied that bottles do not impair flavor.

Bottles are more durable, said 22 percent, adding that they do not

crush or collapse and do not leak. Another 10 percent preferred glass containers for milk because bottles permit one to tell the quality of the milk.

USDA Names Countries Exporting Meat to U. S.

THE Department of Agriculture has clarified the status of meat exporting countries by listing them in an amendment to regulations of the U. S. Meat Inspection Service. Heretofore, countries were placed on the list of those eligible to ship meat to the U. S., or removed from the list, through orders issued to its field agents. Through use of the federal register, the department puts on record current changes in eligibility.

The country whose standards of meat inspection are equal to our own are: Argentina, Australia, Belgium, Brazil, Canada, Cuba, Czechoslovakia, Denmark, Dominican Republic, England and Wales, Finland, France, Ireland, Italy, Luxembourg, Madagascar, Netherlands, New Zealand, Northern Ireland, Norway, Paraguay, Scotland, Spain, Sweden, Switzerland, Uruguay and Venezuela.

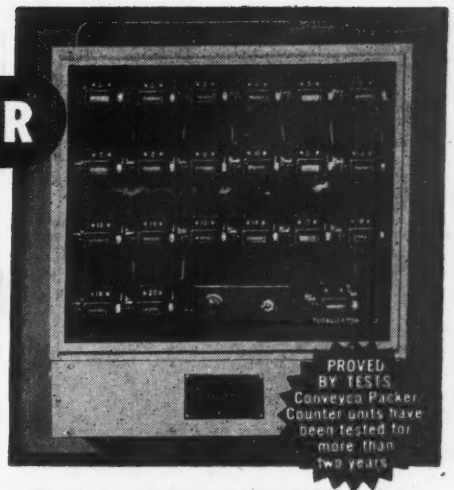
Food Exports

FOURTH quarter export allocations for meat and fats and oils and the November grain export quotas, as set by USDA, are below earlier allocations in the case of wheat, identical for meat and above for fats and oils. Grain quotas total 29,514,000 bu. of wheat, flour and grain sorghums. This compares with the October quota of 45,685,000 bu.

MARGARINE DOWN

At a time when most other foods are flying high, the margarine makers gather a lot of goodwill by turning in the other direction. Decreases in the cost of ingredient oils was given as the reason for the drop.

CONVEYCO
PACKER COUNTER
COUNTS PRODUCTION
Automatically—



AN UP-TO-THE-MINUTE TALLY of production in your plant is always visible with the accurate Conveyco Packer Counter. Each employee's total shows on individual recorders and the total production of the entire plant is recorded on a totalizator.

TESTED IN VEGETABLE PACKING PLANTS and Food Processing Plants . . . the Conveyco Packer Counter has reduced overhead, eliminated errors in counting, and minimized personnel problems regarding piece-work pay.

JUST A TOUCH OF A BUTTON located at each work station counts completed units of work in plants using assembly line methods or where employees are paid on a piece-work basis.

TOTAL TALLY IS DOUBLE CHECKED by an automatic counting trigger which counts items as they leave processing or packing room.

LOW OPERATING COST . . . . Uses less electricity than a 60 Watt light bulb.

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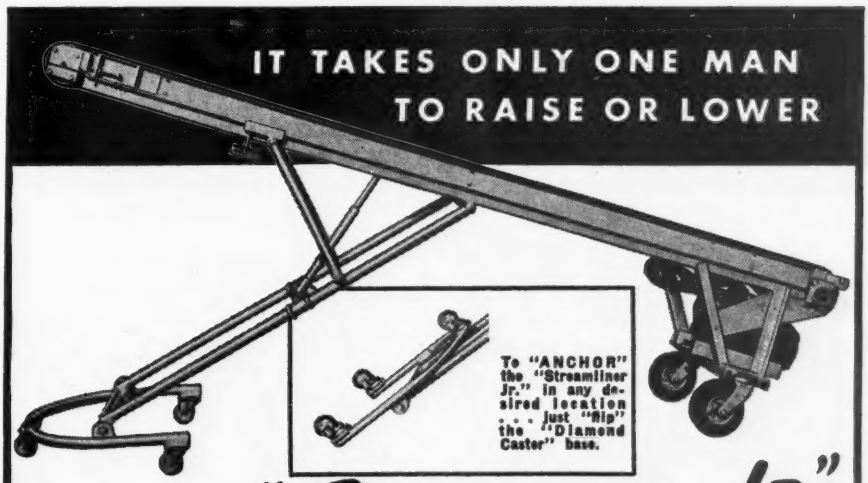

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THE PROCESSING PICTURE

Agriculture Proposes Standards for Potatoes

U. S. consumer standards for potatoes are being considered by the Production and Marketing Administration of the Department of Agriculture. Proposed standards, to become effective during November, were printed in the Federal Register for September 20, beginning on page 6296. The standards are permissive and include specifications for U. S. Grades A and B and Off-Grade. Four sizes are covered: Small, medium, medium to large, and large. Minimum and maximum diameters are established for some varieties and weight requirements are proposed for the long varieties. Size tolerances are also proposed. Definitions and terms used in the proposed standards are subject to consideration if any desire to submit "written data, views, or arguments."

New Soybean Nutrient Developed by Staley

A. E. STALEY MANUFACTURING CO., Decatur, Ill., has developed a nutrient for streptomycin-producing mold made from soybeans. This new soybean nutrient is said to give greater yield at lower material costs, and takes the place of complex growth-producing substances formerly used. The Staley company hopes to increase the yield with the use of the soybean meal nutrient up to 100 percent. The cost to the producers is about one-tenth that of the protein complex materials being used.

In addition to producing the nutrient for streptomycin production, Staley's also makes a nutrient from corn steep water used in the production of penicillin.

Citrus Waste Disposal Gets Test in Florida

A PILOT plant to test a method of citrus cannery waste disposal is being installed at Florence Citrus Growers Association canning plant at Winter Haven, Fla. The Florida Citrus Exchange affiliate is cooperating with the Florida Citrus Commission in a large scale experiment to determine if the new method is of practical and economical value to the industry.

The new method, according to citrus commission researchers, will utilize methane-producing bacteria to consume the solids, leaving relatively pure water to be dumped into disposal pits or lakes. The wastes will be passed through a "sludge" containing the bacteria and a process taking between 48 and 72 hours will result in the production of methane and carbon dioxide with accompanying near-purification of the water.

It is hoped that sufficient quantities of methane can be produced from the method to be used as fuel in firing boilers or other heating uses, thus helping to pay for the cost of the installation. No attempt would be made, under present plans, to capture the carbon dioxide.

KRAUT PACKERS CELEBRATE

Judging from the publicity issuing from Forreston, Ill., the National Kraut Packers really had a day at their annual festival. Two tons of kraut and one ton of weiners were consumed, but only President John M. Stroup was fed in this manner.

The installation consists of two large tanks and associated pipe lines. At the FCGA cannery, these are being located between the plant and a small lake into which wastes were dumped during first runs of the new cannery last spring.

Revise Grade Standards On Canned Dried Beans

REVISION of the canned dried beans U. S. Grade Standards, started in December, 1946, was finally promulgated in the Federal Register of September 23 beginning on page 6324. These grade standards cover five types of canned dried beans: White beans, lima beans, red beans, black-eye beans or black-eye peas, and beans or "peas" of other colors or types. Three styles of pack are provided: In tomato sauce, in sweetened sauce, or in brine. U. S. Grade A or U. S. Fancy, C or Standard, and D or Substandard are established as the grades.

Recommended fill of container is not incorporated as a feature of quality for the purpose of these grades. It is recommended, however, that each container be filled with means "as full as practicable without impairment of quality and that the product and packing medium occupy not less than 90 percent of the volume capacity of the container."

Consistency, character, and absence of defects are the features to be considered in ascertaining the grade. Each feature is rated on a numerical scale. Definitions and explanations are included in the revised standards as published, together with a score sheet for canned dried beans.

These grade standards were to become effective on October 23, superseding the standards that have been in effect since January 10, 1934.

Agene Treated Flour Discussed at Kansas

FITS in dogs are now known to be caused by Agene treated flour in their diet, but no bad effects on humans have been reported, Dr. Max Milner of the Department of Milling Industry, Kansas State College, told members of a tri-section meeting of the American Association of Cereal Chemists at Manhattan, Kansas, September 30. Doctor Milner came to the staff at Kansas State from the University of Minnesota, where he engaged in research work in cereal chemistry.

In the past 20 years the milling and baking industries have come to

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With Lunkenheimer Valves in the line . . . you get better valve service . . . every time. That's the considered opinion of engineers and operating men throughout the nation. From long experience, they know that Lunkenheimer Valves give **extra** years of **better** service, set new low records for over-all valve cost.

Lunkenheimer leadership in engineering and design, valve metallurgy and craftsmanship has been established over many years . . . protected by rigidly enforced standards of highest quality . . . recognized by valve users in practically every industry. When buying valves, the Lunkenheimer name is your assurance of full service . . . complete satisfaction. The Lunkenheimer Company, Cincinnati 14, Ohio, U.S.A. New York 13, Chicago 6, Boston 10, Philadelphia 34. Export Department: 318-322 Hudson Street, New York 13, N. Y.

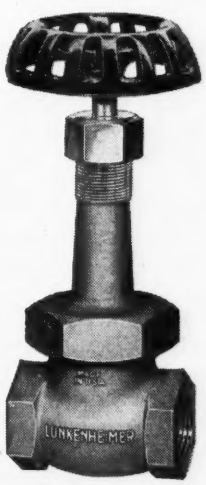

Fig. 2228
200 lb. Bronze
Union Bonnet Gate

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A big stock is not enough. Lunkenheimer Distributor stocks are carefully geared to the particular needs of each territory. This "planning ahead," plus your Distributor's aid in solving operating and maintenance problems, rapid delivery service . . . are the reasons why so many plants rely on their Lunkenheimer Distributors for complete valve service.

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Do you have cleaning fog? Droplets of water clinging to the alleged cleaned surface—haze on glass? Lift it easily with the more thorough, efficient cleaner—Metso. How Metso works in removing the last trace of greasy film is demonstrated in the photos above.

Metso is a scientifically balanced combination of alkali and soluble silica which steps up cleaning action. You're sure of chemically clean, greaseless surfaces.

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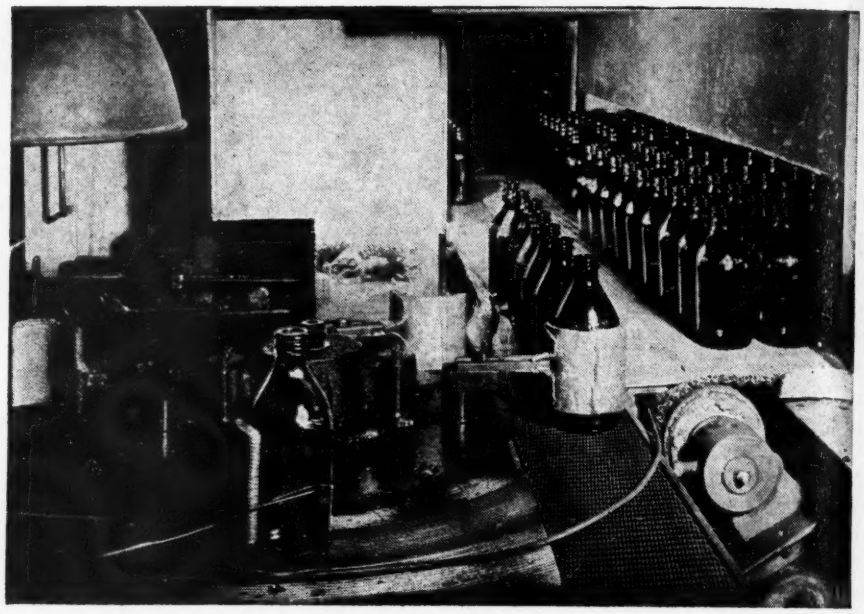


DISPOSABLE BEER BOTTLES

New thin-walled one-way beer bottles, recently introduced by Owens-Illinois, start through the tempering process that gives them their extraordinary strength. It is hoped that these "throw away" bottles may find use in other liquid distribution.

rely extensively on the Agene process for treating flour. By use of this gas, a dilute mixture of nitrogen trichloride in air, for aging and bleaching, it is possible to mature flour without maintaining it in storage for several weeks.

Running fits or canine hysteria are two of the half dozen or so names that have been given to fits occurring in dogs given a diet including Agene-treated flour. The disease seems to have appeared first in the southern states about 1916 and gradually spread north to Canada and then to England. Outbreaks of the disease were very rare in Europe at this time, even when the incidence was high in this country and England.

The speaker drew attention to the interesting fact that while the reason for canine hysteria has been demonstrated only recently, the inception of the disease appears to coincide with the general adoption of the Agene bleaching practice some 20 years ago.

In his review of the published information on the subject, Doctor Milner cited some 50 references in the veterinary medicine literature pertaining to the problem. Experiments with dogs on various dog foods, mainly dog biscuits, indicated that severity of the disease varied directly with the percent of wheat gluten flour in the diet. It still is not known whether other bleaching gases such as chlorine, chlorine dioxide, and nitrosyl chloride confer similar toxic properties to flours as far as dogs are concerned.

It has been shown clearly that symptoms of canine hysteria which occur in dogs fed Agene-bleached flour ceased immediately when this flour was replaced in the diet by the same flour, untreated with the bleach. Doctor Milner also pointed out that at one time it was thought that vitamin and protein deficiencies were responsible.

Research on the effects of Agene-treated flour in the diet is not completed. At first it was thought that the toxic factor affected only dogs, but it has been shown since that cats, rabbits, and ferrets show some ill effects.

Certain nutritionists feel that the relationship of flours treated with Agene to canine hysteria suggests that neurological and psychological ailments of certain types, such as human epilepsy, may also have some connection with the diet.

NCA Coast Lab.

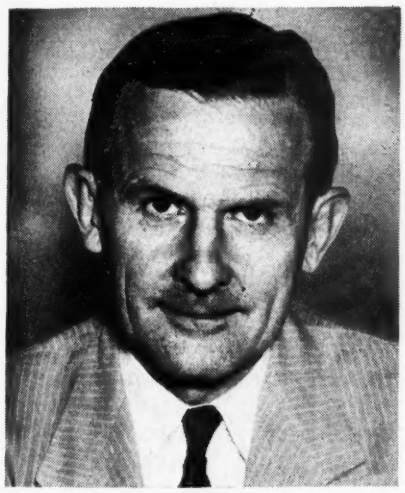
BECAUSE of the increased research requirements of modern industry and the cooperative activity of a large number of companies through trade association work, the National Canners Association, Washington, D. C., is making plans to build a new Western Branch Laboratory at Berkeley, Calif. The present western research facilities of the association are distributed among three buildings in San Francisco. The new laboratory will centralize West Coast operations at one locality, as well as take care of the association's expanded program of research in canning technology.

Candy Research

DR. EDWARD R. WEIDLEIN, director, Mellon Institute, has announced the establishment there of a research fellowship by Fanny Farmer Candy Shops. This fellowship, headed by Dr. M. G. Mayberry, will carry on wide investigations relating to important basic problems in confectionery technology. The program embraces all phases of candy making, including scientific methods for the betterment of manufacturing procedures and especially for defining and controlling the texture of products.

Peanut Standards

PROPOSED grade standards for white spanish and runner peanuts were issued in July. On the basis of written data, views, and arguments received by the Department of Agriculture within the time allowed, "It has been concluded not to issue the proposed standards at this time." This notice appeared on page 6090 of the September 12 Federal Register.



DR. OMER W. HERRMANN

Coordinates Research

DR. OMER W. HERRMANN has been appointed assistant administrator of the Agricultural Research Administration. His job will be coordinating research on utilization and marketing of food and farm products, which will be greatly expanded under the Research and Marketing Act. He will also assist in coordinating market research of the State experiment stations. Prior to his appointment to ARA, Dr. Herrmann was director of the fats and oils branch of the Production and Marketing Administration. During the war he was chief of the food and agriculture section of Gen. Eisenhower's staff.

MALEKIZED*

GENERAL AMERICAN MALEKIZED* RICE PROCESSING PLANT IS STREAMLINED

Streamlining produces the following results:

Low building cost, low basic equipment cost, minimum erection expense, minimum labor requirements, mechanical handling of rice during processing, low steam and water consumption.

The General American Malekized* continuous rice processing plant means more profit for the operator, because:

Head rice yield is substantially increased. (25% or more depending on the variety of rice).

Storage losses are minimized as Malekized* rice is hard, sterile and germ free.

Cooked Malekized* rice appeals to eye and palate with its non-lumpy appearance in which every grain is separate, and full of delightful flavor.

Malekized* rice retains the nutritional value of natural rice (including vitamin B) in its most digestible form.

TODAY *processed rice is a* ***PREMIUM*** *rice—*

TOMORROW *there will be* ***ONLY*** *premium processed rice*

Write and find out how to convert your plant to produce this great new rice of tomorrow—why you should choose the lowest cost, highest capacity process for producing the premium grade Malekized* rice.

*Trade-mark registered. Also © 1947

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ENAMEL
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FRIEND
OF THE PLANT
OWNER... WHO HAS
A WET SURFACE
MAINTENANCE PROBLEM
The Damp-Tex system of painting kills rust, rot, fungus and bacteria. Stops deterioration. Can be applied on any paintable surface, wet or dry, with equal ease and efficiency - changing dingy, rough light-blotter interiors into glistening porcelain-like beauty. One coat covers. Resists acid, alkali, corrosive gases and oxidation. Dries overnight without flavor-tainting odor into waterproof film. Comes in white and colors.
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GENERAL

Wartime Cost, Profit Figures in FTC Report

AN analysis of wartime cost and profit relationships of 4,107 corporations in 22 major industry groups, collected by the Office of Price Administration and released last month by the Federal Trade Commission, provides valuable statistical information on the food processing industries. The figures cover the years 1941 to 1945.

The statistics cover net sales, cost of goods sold, cost of materials used, other manufacturing costs, net changes in inventories, interest figures, special reserves, depreciation, accrued income and excess profit taxes.

Food corporations accounted for 445 of the 4,107 reports in the survey; all corporations reported have assets of $250,000 or more. Of the food companies covered, 271 had assets of $250,000 to $1,000,000, 115 had assets of $5,000,000 to $10,000,000 and 42 had assets of $10,000,000 or over.

The FTC report provides basic information on the costs, sales, and profits derived from confidential reports submitted by the companies surveyed, and yield and authoritative analysis of industry operations available from no other source.

Chem Show to Exhibit Processing Advances

WITH all available space in New York's Grand Central Palace allotted, plans for the 21st Exposition of Chemical Industries, scheduled for the week of December 1, were nearing completion in mid-October. As in previous years, the exhibits will include a variety of raw, partially manufactured or processed materials, along with machinery and equipment. They will embrace the whole field of chemical activity, including of course equipment and processes of interest to the food industry.

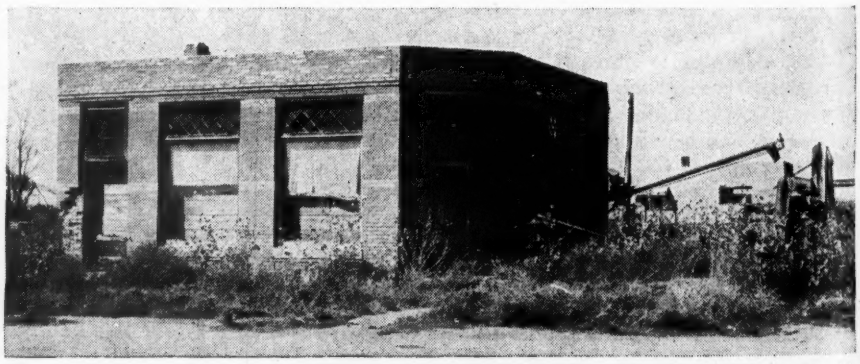
Advance notices indicate that the processing industries will be exceptionally favored in this year's exhibit, particularly in the significant improvements shown in instrumentation and in linking instruments to controls. The growing usefulness of stainless steel and important developments in vacuum processing and materials handling methods are being given close attention this year and these exhibits should be a focal point for most food industry visitors.

Exhibitors at the show of interest to food manufacturers include the following:

Ingersoll-Rand Co.; Buflovak Equipment, Div. of Blaw-Knox Co.; Swenson Evaporator Co.; Glengarry Machine Works, Inc.; George G. Rodgers Co., Inc.; New Jersey Machine Corp.; The Karl Kiefer Machine Co.; Niagara Filter Corp.; Fletcher Works, Inc.; Pneumatic Scale Corp., Ltd.; Bird Machine Co.; Premier Mill Corp.; Tri-Clover Machine Co.; Sprout, Waldron & Co.; Read Machinery Division of The Standard Stoker Co., Inc.; The Dorr Co.; Kinney Manufacturing Co.; National Research Corp.; Allis-Chalmers Manufacturing Co.; The F. J. Stokes Machine Co.; Productive Equipment Corp.; Alsop Engineering Corp.; Omega Machine Co.

Ice Cream Courses

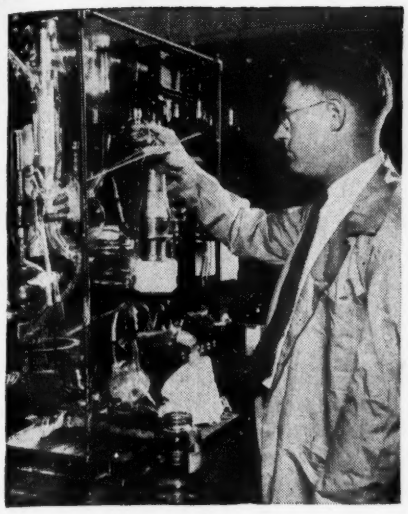
UNIVERSITY OF ILLINOIS, Extension Dept., opened a course, last month, at the Chicago branch, Navy Pier, on the principles of ice cream manufacture. The course is designed for those who have had some training in dairy technology or have had practical experience in the industry.



Wide World

WHEAT REPLACES GOLD

The building here was once a bank in Brandon, Colo., but you can't eat gold so it is now being used to store something useful—several thousand bushels of wheat.



SYNTHETIC "A"

The first commercial production of synthetic Vitamin A was recently announced by Dr. James Baxter, of Distillation Products Inc., Rochester, N. Y., who is here demonstrating one of the steps in the process.

Planning Conference On Materials Handling

THE Second National Materials Handling Exposition and Conference will be held January 12 to 16, in the Public Auditorium, Cleveland. Edwin J. Heimer, president of Barrett-Cravens Co., Chicago, is chairman of the exposition committee.

Already 154 exhibitors have contracted for booth space; 60 percent more than the first show last year. Equipment such as hand trucks, lift trucks, conveyors, hoists, monorails, portable elevators, stacking units, tractors, trailers, fork trucks, skids and pallets will be exhibited. In addition a Materials Handling Theater will show films and there will be an institutional presentation of materials handling equipment and systems in addition to those shown in the commercial exhibits.

Recent surveys have indicated that the handling of materials, a completely non-productive operation, constitutes from 12 to as much as 50 percent of total labor costs in various industries.

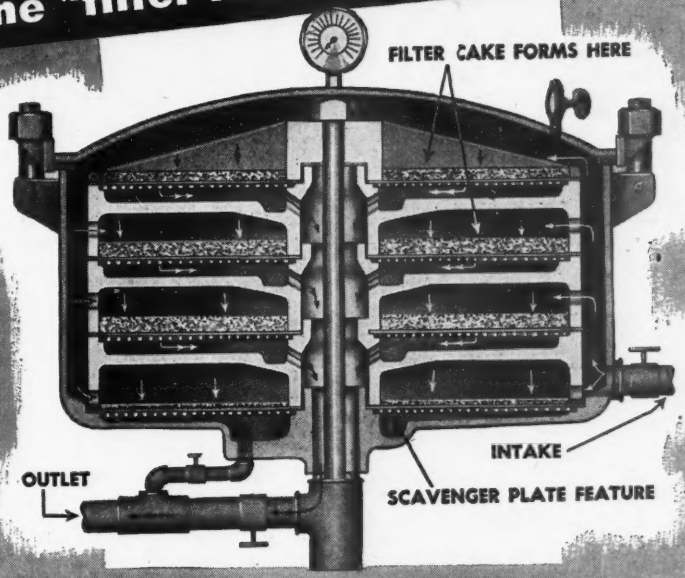
House Organ

SWIFT & Co., Chicago, has a new publication for its employees, "Swift News"; taking the place of the Swift Arrow, the company monthly employee newspaper since 1921. The new publication is of picture-magazine format, of 26 pages, is illustrated and printed in two colors. It contains short informative and entertaining articles of general interest to employees as well as regional plant and personal news. It will be distributed monthly.

the *horizontal plate* principle

makes SPARKLER

the "filter that filters all liquids"



SPARKLER

horizontal plate

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Soap, liquid
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★ Sparkler Horizontal Plate Filters handle any liquid from heavy varnishes to light alcohols.

★ Equally efficient performance on intermittent or continuous operation, under a wide range of temperature, pressure and viscosity conditions.

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★ Patented Scavenger Plate permits *complete* batch filtration. (It's virtually an auxilliary filter with an independent control valve.)

★ Unexcelled filter cake stability — no slipping or breaking.

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Because filter media are supported on a horizontal plane and filter aids floated into position uniformly; filtration takes place uniformly over entire filtering areas. Flow through filter is always *with* gravity.

Sparkler Filtration Is *Engineered* Filtration—we invite correspondence on your problem. You will receive the advice of filtration scientists with a quarter of a century of experience in a specific field.

SPARKLER MANUFACTURING COMPANY
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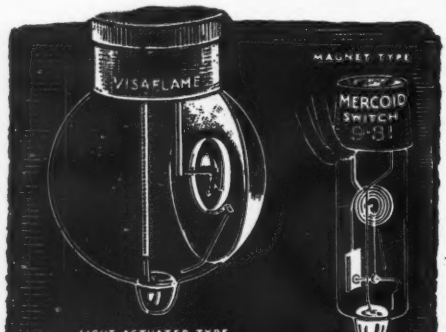
MERCURY SWITCHES

are used in all Mercoid Controls. They assure better control performance and longer control life. That is why Mercoid Controls rate a very high percentage of customer satisfaction -a good reason for specifying-

MERCOID CONTROLS



Dust, air, gases and moisture impair the efficiency and shorten the life of exposed electrical contacting surfaces.

Mercoid hermetically sealed mercury switches are immune to all of these switch damaging elements. The contacting surfaces remain constant in their efficiency, prolonging the life indefinitely.

Mercury switches bearing the registered trade mark name of "Mercoid" are not subject to open arcing, oxidation, corrosion, pitting or sticking of the contacting surfaces.

Mercoid switches are available to the trade in various designs, sizes and capacities.

There are numerous applications where these switches have a definite advantage over the open contact type switches.

Our engineers gladly offer their assistance in the adaptation of our switches to your switch problems.

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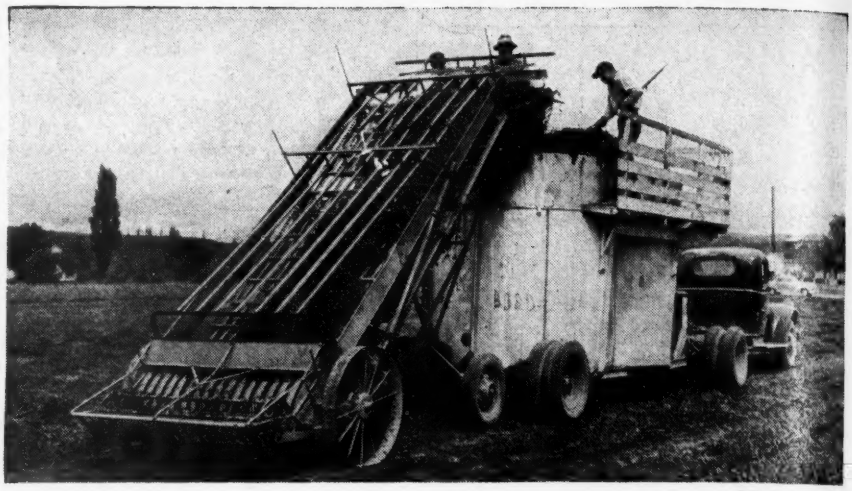
FOR HEATING, AIR CONDITIONING, REFRIGERATION AND VARIOUS INDUSTRIAL APPLICATIONS



Wide World

PEPPERMINT HARVEST

This hay loader is used to pick up windrows of peppermint, near Longview, Wash. Delivered to the top of a specially built trailer, the mint is packed in tubs with false bottoms, then hauled to stills where the essential oil is distilled.

Weights and Measures Stirs Food Processors

THE NATIONAL CONFERENCE ON WEIGHTS AND MEASURES, meeting in Washington last month, provided a sounding board for a spirited discussion of packaging and weighing problems of many phases of the food industry. Representatives of the industry presented their case relative to resolutions proposed and passed by the 250 weights and measures officials of municipal, state, and federal governments.

Among the resolutions approved —all of which indicate the thinking bound to influence changes in local ordinances and state laws—were these presented by the conference's committee on methods of sale of commodities:

Frozen foods. Should be sold by avoirdupois net weight based on original drained weight of the commodity. Weight declarations on packages should conform with the quantity of determinable solids in the package; liquid contents should be expressed on the package in terms of liquid measure.

Dried Fruits. Should be sold by net weight. When in package form the quantity declaration should be in terms of net weight only, and no qualifying term or statement, such as percentage of added moisture, should be officially recognized.

The frozen food resolution was approved by the conference, but later was reconsidered and "tentatively approved." The "tentative" approval was considered as giving the industry a year to "clean up the situation"—and actually amounted to tabling the recommendation until next year.

The resolution as finally passed recommended that packaged frozen foods should bear a quantity declaration determined "at processed temperature before freezing and (shall) be exclusive of all gravy, juice, or preservative, or moisture in excess of the quantity which adheres to the solids in a package due to molecular attraction under weight." The resolution stated that "this shall not prohibit the incorporation for sale of gravy, juice, or preservative, under the conditions specified . . ." provided that ". . . the net quantity of such elements is expressed in terms of liquid measure on the same container, label or tag."

Fruits Seized

Dr. R. A. Osborn, chemist of the Food and Drug Administration, in a prepared talk, said that under terms of the food and drug act, frozen fruits containing excessive amounts of sugar sirup, or water, can be effectively dealt with only under the adulteration provisions of the act. He cited cases in which frozen strawberries, loganberries and boysenberries have already been seized by Food and Drug officials.

In discussing pre-cooked or prepared frozen foods, Dr. Osborn stated that in the opinion of the Food and Drug Administration, there is no way, under present statutes, of controlling the quantity of solid food content in such a package in relation to the quantity of sauce, gravy, or other non-solid ingredient. Using as an illustration frozen "creamed salmon," Dr. Osborn pointed out that the food is sold as a mixture of salmon and sauce, but there is no way in which it could be

proved that the sauce had been substituted for salmon.

"Standards of identity . . . would go far in solving the problem", Dr. Osborn said, "but it seems unlikely that standards under the Food, Drug, and Cosmetic Act can be made for these miscellaneous foods for some years to come."

Campbell Promotes

DONALD M. MOUNCE is the new director of the Campbell Soup Company's kitchens at Sacramento, Calif., according to Campbell president, James McGowan, Jr. He succeeds Odbert C. Zinn, who has retired after 30 years of service with the company.

RAW MATERIALS

Fish Treaty Pressed For Northwest Atlantic

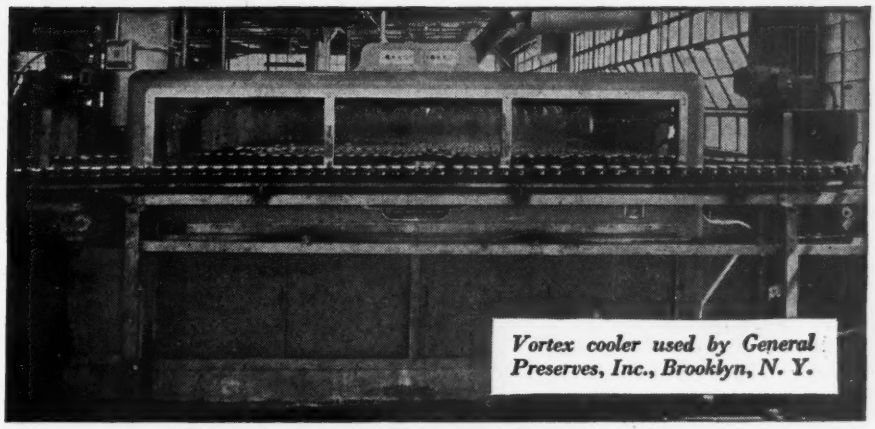
WITH the appointment of Robert W. Tyson to the Fisheries and Wildlife branch of the International Resources Division of the Department of State, the government is pressing plans to conclude an international fishery conservation program for the northwest Atlantic Ocean.

Tyson, Department of Agriculture official since 1928, was, during the war, chief of the Fish and Fish Products Division of the War Food Administration, and was secretary of the Fisheries Committee set up on the Research and Marketing Act of the Department of Agriculture.

He will direct fishery negotia-

AT U. OF TEXAS

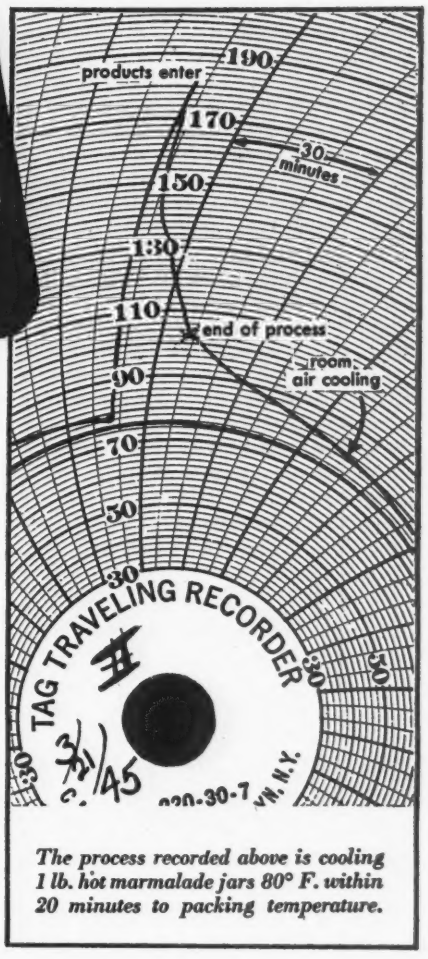
Dr. Rudolf Plank, former director of the Kaeltetechnischesinstitut, at Karlsruhe, Germany, and one of the world's foremost authorities on refrigerating engineering, is now lecturing on thermodynamics and refrigeration at the College of Engineering, University of Texas, Austin, Tex.



Vortex cooler used by General Preserves, Inc., Brooklyn, N. Y.

Your Hot Packaged Foods Deserve

VORTEX Automatic Cooling



The process recorded above is cooling 1 lb. hot marmalade jars 80° F. within 20 minutes to packing temperature.

Automatic cooling of your products deserves scientific treatment to preserve the original flavors and clarity by *positive* control of time and temperature.

The Vortex system is entirely automatic in operation and can be run continuously without operators, requiring only routine maintenance. The heat exchange medium is atomized water, distributed over the containers in such a manner that maximum cooling is achieved with a minimum quantity of water.

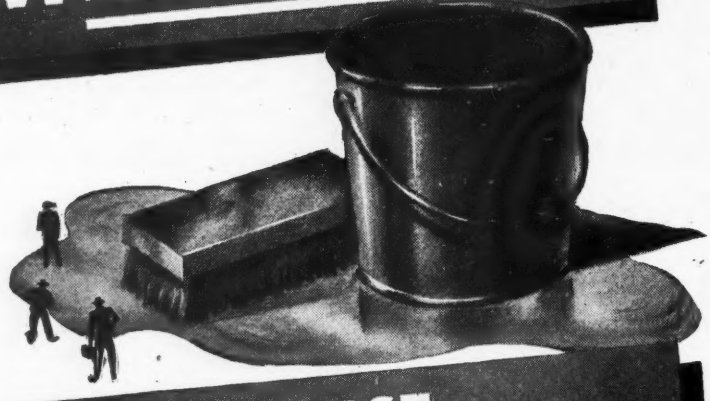
Vortex coolers are widely adaptable to individual requirements and have an almost limitless capacity range for all sizes of jars, bottles or cans. The use of these machines greatly conserves floor space and allows for immediate labeling and packing. A rapid drying system can be supplied with the discharge conveyors, if desired.

Whatever your problem of cooling—or heating—your products, it will pay you to learn the Vortex method of achieving uniform results economically. Send us your process requirements and write for bulletin No. 87 today.

BARRY-WEHMILLER MACHINERY CO.

1947 . . . Our 62nd Anniversary St. Louis, Mo., U.S.A.

STRENGTH Without Odor!



WEST TERAMINE DISINFECTANT

For industries whose nature requires a disinfectant with unusual bactericidal powers *plus* lack of odor, Teramine is the *perfect solution.* This fully tested and guaranteed* disinfectant provides a phenol coefficiency of "20" against EB. Typhosa and of "28" against Staphylococcus Aureus (pus germs), and "7" against Escherichia Coli. Storing or freezing does not lessen Teramine's lethal potency. And it's economical too—you use only 1 ounce to 1 gallon of water.

Consult one of the 475 West representatives. You'll find their guidance invaluable.

As tested by the F.D.A. Method of the U. S. Department of Agriculture—circular 198.

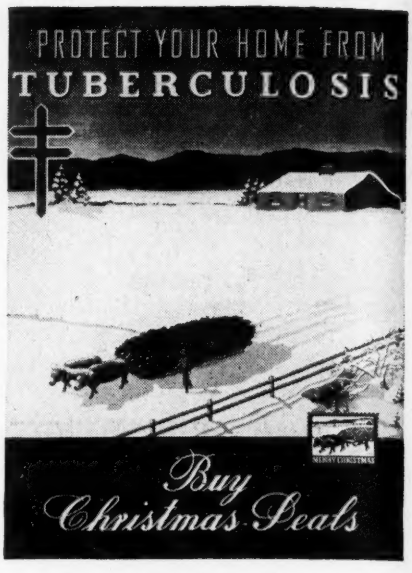
Products That Promote Sanitation

WEST DISINFECTING Company

42-16 WEST STREET
LONG ISLAND CITY 1, N. Y.

★ BRANCHES IN PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

CLEANSING DISINFECTANTS • INSECTICIDES • KOTEX VENDING MACHINES
PAPER TOWELS • AUTOMATIC DEODORIZING APPLIANCES • LIQUID SOAPS



CHRISTMAS SEALS

The 41st annual Christmas Seal sale of the National Tuberculosis Association gets under way November 24. More than 3,000 affiliated associations will take part in the drive for much needed funds.

tions bill last June at the instigation of Senator Green, of Rhode Island.

The conservation program will be directed at preventing further depletion of several species of fish taken from northwest Atlantic waters, particularly haddock. The countries involved, besides the U. S., are Canada, Newfoundland, England, France and Portugal.

Hawaiian Vanilla

VANILLA plants growing wild and in abundance on the islands of Oahu and Hawaii promises to give the food extract handlers a new lease on life. Dr. Alexander Katz, of the Los Angeles company bearing his name, reports that on a recent trip to the Islands he was able to obtain vanilla beans that after curing were found to contain 8 percent of moisture and yielding a vanilla extract of finer taste and aroma than were such materials obtained from the best Madagascar and Mexican beans.

Doctor Katz is now investigating the possibility of obtaining quantities of these beans as well as the future possibilities of vanilla production in Hawaii.

Sour Potatoes

A MINOR portion of state grown potatoes were reported to have turned sour in cooking last month, according to the New Jersey Department of Agriculture. Blame for the off

odor and off taste spuds was placed on a few growers who "went overboard" in applying benzine hexachloride, an insecticide recommended to combat the wire worm. The department said the insecticide, harmless to humans, had been recommended for experimental purposes and but relatively few growers had applied it liberally.

Czechs Reverse Order Ship Potatoes to S. A.

PRAGUE—Czechoslovak food industry is varying the general order of things by exporting potatoes to South America. Four thousand tons of new potatoes, carefully packed in wooden cases in refrigerated space, are making a long land journey and diagonal trans-Atlantic crossing to Montevideo.

Leaving Europe in late summer, the potatoes after a few weeks on the way are due to reach Uruguay by early spring (Southern Hemisphere).

After a bumper crop of potatoes last year, the Czechs thought potatoes would be a good export bet and planned an exportable surplus from this year's sowing also, which will probably be less than expected owing to the severe drought which has hit the whole harvest.

Canned Citrus Process Developed by Aussies

MELBOURNE—A polarographic procedure for the determination of dissolved oxygen in citrus juices has been developed by the Australian Council for Scientific and Industrial Research. The method gives practically instantaneous readings, which can be used for control during processing. The procedure involves a correction for the sugar in the citrus juice that reduces the diffusion current.

The method has been successfully used in the study of the performance of the Homebush deaerator, and the available evidence indicates that deaeration as carried out at present under commercial conditions does not contribute significantly to flavor retention in canned fruit juices.

There's nothing complicated or mysterious about the construction or value of Hamilton kettles, but at every point they show knowledge of food men's needs and the skills that alone can produce such good equipment. No finer kettles are made—none are a better investment. No other kettle will stand up longer for less per day.

LOOK INTO MIX-COOKING

THE HEART OF FOOD PROCESSING

EVERY TYPE OF FOOD KETTLE

Hamilton Mix - Cookers and kettles of all types are fabricated in all metals and in any size, standard in design or engineered to the job. Our heavy production brings costs down.

Send for descriptive Hamilton Kettle Bulletins. Describe the mixing or cooking job to be done. We'll recommend properly engineered equipment.

LOOK FOR

Hamilton Mix-Cookers and all other Hamilton kettles are made only by Hamilton Copper & Brass Works, Inc., Hamilton 2, Ohio. EST. 1876

THE KETTLE WITH THE HAMILTON NAME

IN EVERYDAY CLEANING—
101 Different Uses
for a Farquhar
Hi-Pressure Cleaning Unit

designed

To Save Time
and Cut Costs

For daily cleaning of *hard-to-reach* places, there are 101 different uses for Farquhar Hi-Pressure Cleaning Units . . . uses that mean greater savings of time and money for you.

Waste accumulations on vats, belts, coolers, tanks, floors, etc., are dislodged easily and swept away quickly by means of a high velocity jet spray of hot or cold water at pressures up to 500 lbs.

Available in two sizes, Farquhar Hi-Pressure Cleaning Units do a thorough cleaning job day in and day out—in less time . . . at less cost. For the cleaning units you need, contact Farquhar today.

Other Equipment for the Processing Field

HYDRAULIC JUICE PRESSES • SPRAY-COOLERS • TRIMMING TABLES

SPECIAL MACHINERY FOR THE PROCESS INDUSTRIES
Conveyors • Hydraulic Presses • Farm Equipment

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A. B. FARQUHAR COMPANY
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India Breweries Get Five-Point Program

NEW DELHI, India—A five-point program for assisting the Indian brewery industry is proposed by a panel appointed by the Indian Government Food Department to survey the field and make recommendations for its development.

The panel reported that the four breweries in the country (one of which now is in Pakistan) have a combined capacity of 4,020,000 gal. annually—or enough to satisfy almost all India's demands if higher quality could be achieved. Prewar consumption was 4,770,000 gal., of which 3,623,000 gal. were imported.

Biggest stumbling block to development of a high-quality beer that might compete in foreign markets as well is the fact that India produces almost no barley. All the breweries are under European direction.

The panel's recommendations are:

(1) Excise duties between Indian and foreign beers ought to be equalized. At present the province of manufacture levies excise as does the province of sale, which puts a price disadvantage on the Indian product; (2) imported beer should pay a higher tariff duty to protect indigenous beer; (3) all government purchases of beer for service canteens should be restricted to Indian beer; (4) government should take steps to develop a demand for beer byproducts such as yeast; (5) a system of price control and protective tariffs should be developed to assist development of an indigenous bottle and cap industry, and bottle sizes should be standardized.

New Method Offered for Cheese Curd Treatment

MELBOURNE—Kraft Walker Cheese Co. Pty. Ltd., Melbourne, has perfected a new method of firming and drying cheese curd after the first of the whey has been removed. The curd is transferred by a centrifugal pump from the vat to a rotatable perforated drum specially designed for the purpose. It is supported by a tiltable frame which allows the drum to be tilted and empties into a receiving vat.

After one batch has been pumped into the intake end of the drum, the drum is rotated at high speed and thereby made to discharge the whey through the perforations. The whey is collected in a tray and delivered into a launder. After a sufficient portion of the whey has been expelled, the drum is tilted

while continuing to rotate at a slow speed. This movement facilitates quick and complete discharge of the dry curd into the receiving vat. The machine travels on rails flanked by vats and can therefore be charged from or discharged into any vat.

Gas Sulphur Paste Fights Russian Pests

MOSCOW—A new effective preparation for fighting blights and pests, called colloidal sulphur or gas sulphur paste, has been developed by the Scientific Institute for Fertilizers and Insectofungicides of the Soviet Ministry for the Chemical Industry.

Colloidal sulphur is obtained from coke-oven and producer gases by stripping them of hydrogen sulphide by means of the arsenic-soda method. The diameter of the sulphur particles comprising the paste amounts to 0.005 millimeter or even less, which enables the paste to be sprayed on the fields.

As a result of experiments, the Institute established that this paste may be converted into a valuable preparation for fighting blights and pests.

To begin with, all admixtures in the paste which may cause burns to the plants are washed away until the preparation becomes harmless even to the tender blossoming petals of apple trees, rose leaves, gooseberry blooms, etc.

To make sulphur soluble in water, thus making it usable for spraying, a one percent solution of sulphite cellulose extract is applied in the final washing out of the sulphur.

Colloidal sulphur is prepared in the form of paste containing 50 percent of moisture, or of powder containing from 15 to 20 percent of moisture. In preparing the powder which is more convenient to use, additional moisture is removed on centrifuges, after the washing out.

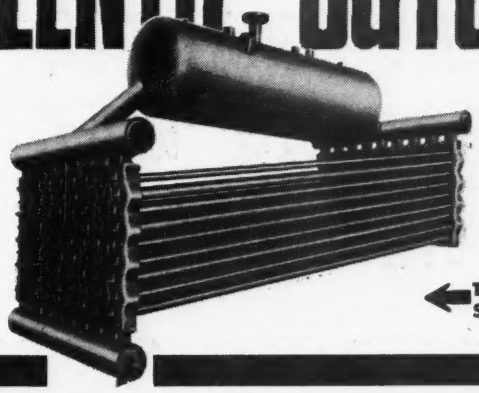
Citric Acid

MOSCOW—An experimental plant for producing crystal citric acid from molasses instead of from sugar is being built in Riga, following the discovery of Latvian scientists of a fungus that ferments molasses into citric acid.

The citric acid output from molasses by this method is reported to be 50 percent higher than from pure sugar by former methods. The process was developed by experts from the Riga Research Institute.

Steamaster Builds Boilers with

PLENTY OF GUTS!



The GUTS of the Steamaster Boiler

IF YOU

designed and built your own boiler you'd make sure it had

PLENTY of GUTS

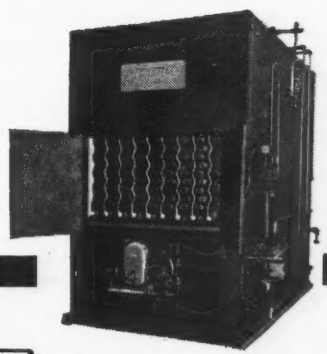
Water Tube Design
Inclined Tubes
Sectional
Steel Headers
Longitudinal Drum

CHECK *the features you'd include if you designed your own boiler*

- ☐ Water Tube Design
- ☐ Inclined Tubes
- ☐ Sectional Steel Headers
- ☐ Longitudinal Drum
- ☐ All Steel Construction
- ☐ Positive Tidal Circulation of Water—maintains all parts at equal temperature.
- ☐ Condensate Return System Built-in as an integral part of all boilers of 60 h.p. and up.
- ☐ Easy Inspection and Maintenance—every tube immediately accessible. Just open the heavily insulated access doors.
- ☐ Large Combustion Area . . . Three-Pass Heat Baffling gives high thermal efficiency.
- ☐ Choice of Fuel—Gass, Oil or Coal or any combination of these fuels to meet fuel requirements of your plant.
- ☐ Fully Equipped for Automatic Operation—with the finest accessories. As nearly automatic as a boiler can be.
- ☐ A.S.M.E. CODE—National Board Approved. Inspected and certified by Hartford Steam Boiler Inspection and Insurance Co.
- ☐ Full Range of Sizes from 10 h.p. to 300 h.p. as illustrated. The Model A for 3½ h.p., 5 h.p. and 7½ h.p.
- ☐ Can Be Fired Over Rated Capacity and still maintain high thermal efficiency.

these features . . .

which you'd have in your own boiler design are built in all Steamaster Boilers from 10 horsepower to 300 horsepower. Fabricated entirely in our own factory.



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Russian Wine Output Surpasses Last Year

Moscow—A major branch of the Soviet food industry, wine-making, will this year substantially surpass the 1946 output of 9,600,000 decaliters of diverse wines, including 4,000,000 bottles of champagne. Increased output will come from a bumper grape crop, from restored wineries in war-devastated areas and from new wine-making facilities in Soviet Asia.

This year's fruit crop is reported to be excellent in Central Asia as well as in Azerbaidjan and Georgia, old centers of Soviet wine-making. From Georgia and Turkmenia come reports of a grape crop double that of last year.

SCHEDULE OF EVENTS

November

2-6—Super Market Institute, 10th Annual convention, Hotel Sherman, Chicago.
3-4—Millers National Federation, fall meeting, Hotel Jefferson, St. Louis, Mo.
10-12—Grocery Manufacturers of America, 39th annual meeting, Waldorf-Astoria, New York.
17-21—American Bottlers of Carbonated Beverages, 29th annual meeting and international beverage exposition, Convention Hall, Atlantic City, N. J.
18-19—Packaging Institute, 9th annual forum, Hotel Commodore, New York.
19-20—American Butter Institute, 39th annual convention, Congress Hotel, Chicago.
30-Dec. 2—New England Bakers Association, fall convention, Copley-Plaza, Boston.

December

1-6—21st Chemical Industries Exposition, Grand Central Palace, New York.
3-5—National Association of Manufacturers, 52nd Congress, Waldorf-Astoria, New York.
3-5—Tri-State Packers Association, fall convention, Hotel Traymore, Atlantic City, N. J.
8-10—American Society of Refrigerating Engineers, 43rd annual meeting, Hotel Traymore, Atlantic City, N. J.

January

7-9—Northwest Canners Association, annual meeting, Multnomah Hotel, Portland, Ore.
11-13—National Preservers Association, annual meeting, Stevens Hotel, Chicago.
12-13—Southeastern Frozen Foods Association, annual meeting, Biloxi, Miss.
13-16—National Food Brokers Assoc., Atlantic City, N. J.
16-17—National Pickle Packers Association, winter meeting, New York.
16-21—Canning Machinery and Supplies Association, annual exposition, Public Auditorium, Atlantic City, N. J.
18-21—Food Industry Exposition, Steel Pier, Atlantic City, N. J.
18-22—National Canners Association, 41st annual convention, Auditorium, Atlantic City, N. J.
19-31—Pennsylvania State College, Ice Cream Short Course, for plant personnel, State College, Pa.
22-23—National Dairy Council, annual winter conference, Hotel Schroeder, Milwaukee, Wis.
26-29—Refrigeration Equipment Manufacturers Association, 5th all-industry exposition, Public Auditorium, Cleveland, Ohio.
13-17—National Food Brokers Association, Public Auditorium, Atlantic City, N. J.

Changes in Food Supplies

(Indicators)

Production

Creamery butter output in August, estimated at 116,920,000 lb., was a 21 percent drop from July, and was the lowest for the month since 1922 and was 22 percent lower than the five-year average for the month. It was, however, only 1 percent below August, 1946.

American cheese showed a sharper July-August decline than usual although production continued at a record level. Estimated at 89,875,000 lb., August output was down 21 percent from July, but was up 11 percent over August 1946 and 12 percent above the 1941-45 August average.

Ice cream production came to within 2 percent of the August, 1946 and was 3 percent more than the July output, only the second time on record that August output exceeded July. Estimated at 75,885,000 gal., production was 47 percent above the 1941-45 average.

Processed egg output, in August, showed sharp changes over August, 1946. Liquid egg production came to 21,676,000 lb., 52 percent below a year ago; dried egg output totaled 1,324,000 lb., the smallest for August since 1940; frozen eggs, on the other hand came to 15,367,000 lb., about double the August production last year.

Flour production was estimated at 24,900,000 sacks, in July, up 3 percent from June and 13 percent greater than the July, 1946 output of 22,100,000 sacks.

The Alaska salmon pack totaled 4,204,004 cases, as of September 15. This close to complete total compares with last year's small pack of 3,880,108 cases.

Materials

Hatchery production in August was 24 percent above August, 1946. A total of 34,237,000 chicks were produced during the month, compared with 27,525,000 in August last year. About 1 percent more chicks have been hatched in the first eight months this year than were produced in the same period a year ago, the total being estimated at 1,127,424,000.

Lard output dropped to 117,595,000 lb. in August, from a July output of 139,113,000 lb.

Refined soybean oil production in August, estimated at 91,251,000 lb., was 8 percent less than the July output of 98,720,000 lb., and 14 percent less than the reported August, 1946 production of 106,081,000 lb.

Stocks and Storage

Canned peas in the hands of wholesale distributors, September 1, totaled 10,327,000 actual cases, which is about the same as September, 1946, but far above the 1943-45 average of 4,914,000.

Frozen fruit stocks in cold storage, September 1, totaled 410,000,000 lb., which compares with a revised estimate of 374,000,000 lb. a month earlier and 460,000,000 lb. a year ago.

Frozen vegetable stocks in cold storage, September 1, totaled 330,000,000 lb., compared with 308,000,000 lb. a month earlier and 285,000,000 lb. on September 1, 1946.

Frozen fish and shellfish in storage September 1, came to 131,482,209 lb. This compares with holdings of 110,306,360 lb. a month ago and 152,402,505 lb. on September 1, 1946.

Freezer occupancy rose 1 point during August, reaching 80 percent on September 1. Cooler occupancy showed no change from August 1, remaining at 76 percent.

Indexes

Business Week's index of business activity was 183.6 for the week ending October 4, as against 183.7 for the preceding week, 184.4 a month ago and 181.9 a year ago.

The commodity price index on food, compiled by the New York Journal of Commerce was 209.9 for the week ending October 11, which compares with 208.4 for the preceding week, and 206.6 for September.

CONSTRUCTION NEWS

	Pending (thousands)	Total Awarded Oct., (thousands)	Total Awarded 1947 (thousands)
Bakery	$ 135	$	$ 16,141
Beverages	2,136	460	31,083
Canning and Preserving	555	....	534
Cold Storage	60	....	4,404
Confectionery	....	....	514
Grain Mill Products	115	350	29,247
Ice, Manufactured	55	....	355
Meats and Meat Products	310	....	5,240
Milk Products	1,975	118	8,018
Miscellaneous	645	100	15,199
	$5,986	$1,028	$110,735

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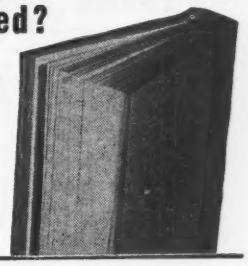

COMMERCIAL FRUIT AND VEGETABLE PRODUCTS

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Gives accurate information regarding the sources and preparation for market of our most important foods of both plant and animal origin, and the methods by which they are handled in quantity and prepared as articles of commerce.

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By CHESTER LINWOOD ROADHOUSE, Professor of Dairy Industry, and JAMES LLOYD HENDERSON, Instructor in Dairy Industry, University of California. *McGraw-Hill Publications in the Agricultural Sciences.* 624 *pages,* 6x9, *illustrated,* $6.00.

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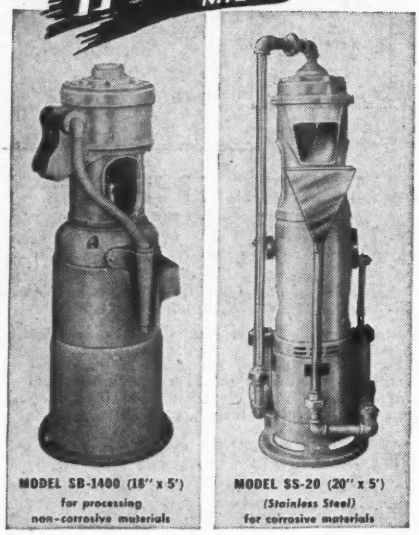

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What Washington Thinks

By R. S. McBRIDE, Washington, D. C.

MACHINERY IS SCARCE—Food technologists are unable to get all the machinery they want. This is in part the result of lack of capacity at plants building industrial equipment. More basically it results from a scarcity of iron and steel. Automobile, farm machinery, construction, road building, and a half dozen other major steel users are competitors for the essential raw material. Probably few food technologists know that farmers alone buy each year more than $800,000,000 in new farm machinery other than tractors. No wonder it is hard to get that wanted new food plant equipment for materials handling or other processing job.

BETTER SALARIES—Even Uncle Sam is now talking about better salaries for scientific personnel. Congress authorized 45 positions for scientists and engineers at $15,000 per year, for top workers in the military departments. This is going to make it somewhat easier for Uncle Sam to keep his best technical men. It is going to be harder for industry to buy such talent away from the government. Apparently colleges have not yet met the situation comparably.

STILL GROWING—Cooperatives for farmer marketing and purchasing now have over 5,000,000 members, according to recent estimates of Farm Credit Administration. And these cooperatives are still growing in numbers and in magnitude of their business, which last year exceeded $6,000,000,000. Any food raw-material purchasing or food-marketing program that ignores the cooperative is neglecting a large area of modern merchandising.

HANDICAPPED WORKERS—The first week of October was called "National Employ the Physically Handicapped Week." The movement should find extensive response in the food industries, which have many tasks that can be safely and effectively done by those who have suffered some physical impairment. With the scarcity of dependable and careful workers, which most areas now experience, there is need for a conscious effort in hiring and training such personnel. Actual experience proves that they are dependable, often causing less absenteeism than those more fortunate physically. Their use demands a bit of thoughtful attention to detail in job organization and job assignment, but most such people will quickly prove the equal of the unhandicapped, on rightly planned assignments. Oftentimes the bit of extra initial training is more than offset by the likelihood that such workers will stay much longer on a job than the roving type, who are easy to hire but also easy to lose.

KILL THAT VIRUS—Only in recent years has the virus problem had deserved attention. Even now means of controlling virus diseases of humans, domestic animals, and plant life are too little known, but the necessity of killing the virus rather than taking a chance is now very fully appreciated by national authorities. One of the latest problems of interest to the food industries is the rigid inspection being planned to prevent entry of hoof and mouth and of citrus diseases, some of which may be virus-caused. Another new movement is the effort of Public Health Service to find any chemical that will surely kill a virus. Anyone who can identify such specifics, even though they would also kill the host, human, animal, or plant, will take us one step closer to solution of virus problems. Meantime quarantine seems our only remedy.

"DEPOSITS" WORKED—One of the big chemical companies recently was experiencing serious trouble in getting back the drums in which it shipped its goods to customers. Finally, in desperation, it imposed a deposit charge of $10 per drum. The drums began to come back very much more promptly. Applying this to the food industries raises the question as to

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MEN • JOBS • COMPANIES

INDUSTRY

Agar Packing and Provision Corp., Chicago, has begun construction of a four-story addition to its packing plant for expanded processing operations.

The Borden Company has opened its new $50,000 cheese plant at Gainesboro, Tenn. The unit has a daily operating capacity of 20,000 lb. of whole milk for American cheese.

Coca-Cola Bottling Co. of Lynn, Mass., plans the erection of a $258,475 plant in Lynn.

Cranberry Canners, Inc., North Chicago, is building a one-floor 28,000 sq. ft. addition to its plant to house additions in the production line set-up for increased production. To cost approximately $55,000, the new facilities will include storage capacity and two new boilers to be fired with gas, fuel oil or coal.

The Cudahy Packing Co., Chicago, has purchased the Machlin Meat Packing Co. plant at Fresno, Calif., for a reported price of $400,000. The plant is equipped with elevated concrete pens which are automatically flushed. The killing and processing facilities are augmented by a sausage factory and a rendering plant. Plant capacity is 300 cattle or 1,000 hogs daily.

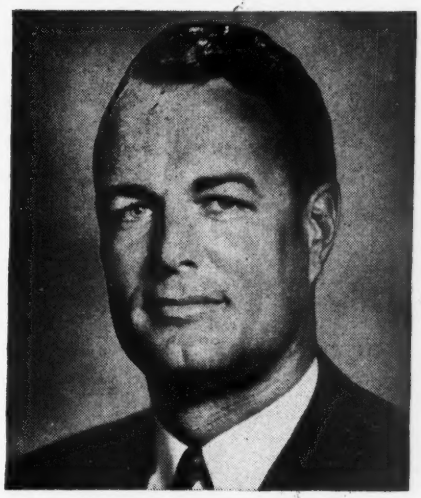
Durkee Famous Foods, a division of the Glidden Co., Cleveland, has named Oliver Fiala technical director in charge of research, and Earl E. Miles general superintendent of the margarine division. Both will make their headquarters in Chicago.

Forbes Food Products Co., Kalkaska, Mich., has been incorporated by Laurie Forbes for $50,000 to manufacture and sell prepared horseradish and relishes.

Kraft Foods Co. plans the construction of a $250,000 building in Atlanta, Ga., to provide office space and additional production and distribution facilities.

Kuder Citrus Products Co., Bartow, Fla., has purchased the citrus molasses plant, operated by the company during the war, from the War Assets Administration, for $130,000.

Mead Johnson Co., Evansville, Ind., has announced three new products. One carries the trade name of Lonalac, a low sodium powdered milk, produced for sufferers from high blood pressure. The second is Protenum, a high protein milk for persons suffering from protein deficiency. The third is vitamin capsules.

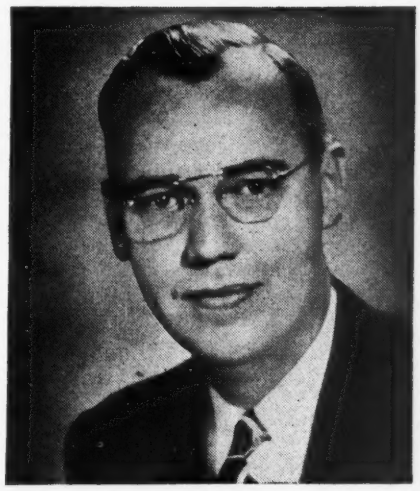


DR. GEORGE KEITH FUNSTON

President of Trinity College, Hartford, Conn., Dr. George Keith Funston has been elected a director of General Foods Corp. Dr. Funston is a graduate of Harvard Business School.

DR. FRANK J. RUDERT

In his new capacity as director of research for Red Star Yeast & Products Co., Milwaukee, Dr. Frank J. Rudert will direct the company's research program as well as supervise laboratory control of production.



ED SCHOENFELD

Formerly assistant chief chemist, Reid Murdoch Co., Chicago, Ed Schoenfeld is now manager of product application for the seasoning division of Wm. J. Stange Co., Chicago.

ROBERT J. SUMNER

Now research chemist on the staff of the American Institute of Baking, Robert J. Sumner formerly was director of research and control laboratories for C. J. Patterson Co., Kansas City, Mo.

Miller Brewing Co., Milwaukee, has a $5,000,000 expansion program under way, to be completed by January 1949. A new four-kettle capacity brewhouse will be built and the bottling plant will be enlarged to accommodate two new high-speed bottling lines. The brewery's capacity will be increased about 35 percent, to 1,100,000 barrels annually.

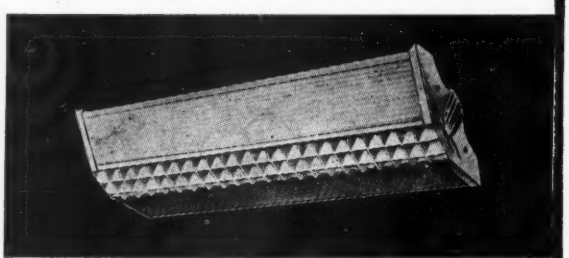
New England Fish Co. announces the new location of its general office at 1828 Exchange Building, Seattle.

Peter Pan Bakeries, Inc., of Michigan, has entered the manufacturing field with acquisition of rights to a new automatic bun and roll making machine.

Pineapple Growers Assoc. of Hawaii elected the following officers at its annual meeting: Elvin Music, Los Angeles, president; H. E. MacConaughey, San Francisco, 1st vice-president; L. J. Taylor, San Francisco, 2nd vice-president; R. G. Bell, Honolulu, 3rd vice-president; Dr. C. E. Auchter, Honolulu, 4th vice-president; C. L. Queen, San Francisco, secretary; G. E. McDearmid, San Francisco, treasurer and chairman, advertising committee.

The VANGUARD

Newest SILV-A-KING Fluorescent Fixture . . . for commercial installations



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WALTER H. RINGWALL

Recently appointed manager of the Wilkes-Barre, Pa., plant of Carr-Consolidated Biscuit Co., Walter H. Ringwall succeeds W. J. Madison, who has resigned.

Southern Fruit Distributors, Orlando, Fla., is planning the construction of a new peach canning plant in Griffin, Ga. The company has plants at Caruso, Ga., and Perry, S. C.

PERSONNEL

Charles Cummings, Barryton, Mich., has been elected president of the Michigan Potato Growers Exchange.

Ralph G. Golseth has been elected a vice-president of the Glidden Co., Cleveland. He will assume full responsibility for the company's soya products and feed mill divisions, at Indianapolis, and will maintain his office at the soya processing plant, Chicago.

Frank J. Helmer, former instructor in the Food Service Schools of the Quartermaster Corps, and Robert Henchal, formerly with the Acme Baking Co., Marshalltown, Iowa, has joined the teaching staff of the American Institute of Baking, School of Baking. Mr. Helmer is head of the variety products department and Mr. Henchal will assist in both the bread and variety products departments.

O. W. Herrmann, formerly head of the Fats and Oils branch of the Production and Marketing Administration, has been named assistant research administrator of the U. S. Dept. of Agriculture.

Robert M. Hill, formerly assistant head miller in charge of the Akron, Ohio, plant of Quaker Oats Co., is now rolled oats milling engineer for the Purity Oats Division, General Mills, Inc., Minneapolis.

John F. Hoffmeister has been ap-

Production Steps to Profits

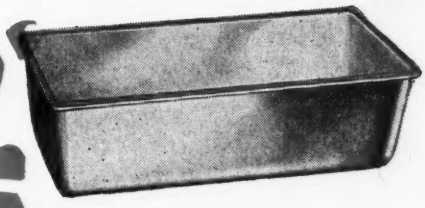
COOKING...

Wear-Ever Aluminum jacketed kettles heat so quickly, so evenly, you get more production per hour. The tougher, harder alloy now used means longer life than ever before.

These light-to-lift pails stand up for years. Seamless, can't rust.

BAKING...

Rustless Meat Loaf Pans with Wear-Ever seamless construction. The fast, special heat absorbing finish means better meat loaf products.



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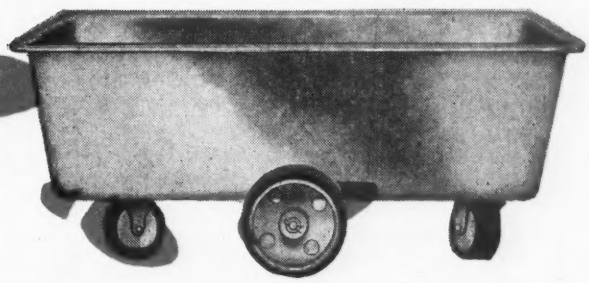
Super-tough seamless tubs; heavy, welded base ring withstands daily punishment; welded bead; sanitary.

MOVING...

Where else will you find these features in a meat truck? Lightweight, rubber-tired, a cinch to handle. All-welded construction, inside welds ground smooth, no seams or crevices. Sanitary and easy to clean.



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Made of the metal that's friendly to food.

● One of the several features of Globe KANRY-TEX is its ease of complete cleansing ...a quality which you, in the food processing business, rightly require and insist upon.

KANRY-TEX is washable with live steam, hot water or sterilizing agents... and with minimum time and effort.

But there are other points of superiority in Globe KANRY-TEX which leading canners and food processors have found of vital importance:

KANRY-TEX *does not impart odor or taste*
KANRY-TEX *resists moisture, alkali, fats, oils*
KANRY-TEX *is long-lasting and economical*

We'd like to tell you more in detail about the advantages of Globe KANRY-TEX. We're sure you'll be interested for many practical reasons. Write today to your mill-supply house ... or direct to us.

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GLOBE WOVEN BELTS

pointed director of engineering for International Milling Co., Minneapolis.

John C. Holme, formerly product advertising manager of Libby, McNeill & Libby, has joined the Franklin Baker Division of General Foods Corp., as mechandising and advertising manager.

W. L. Hunter has been appointed manager and sales manager of the Chicago Bakery of Sunshine Biscuits, Inc. Mr. Hunter, who has served as sales manager since 1942, succeeds J. A. Danaher as manager. Mr. Danaher recently was transferred to Sunshine's Dayton Bakery.

Dr. George W. Irving, Jr., has been named assistant chief of the Bureau of Agricultural and Industrial Chemistry, U. S. Dept. of Agriculture.

William C. Kruger, formerly superintendent of canning operations at the Chicago plant of Wilson & Co., is now director of operations for Stokely-Van Camp, Indianapolis, Ind.

George Kuck has joined Carr-Consolidated Biscuit Co., Wilkes-Barre, Pa., where he will be in charge of industrial engineering, specializing in production and organization.

Dr. Daniel Melnick is the new director of the Institute for Applied Research, Dayton, New Jersey.

Robert V. Rasmussen has resigned as chairman of the board of directors of National Tea Co., but will continue as a director.

Walter S. Richert, formerly with the Fruit and Vegetable Products Branch, Quartermaster Subsistence Research and Development Laboratory, Chicago, is now technical editor, *Wines & Vines*, and editor, *Grape Grower*, San Francisco.

G. E. Robertson is general manager of Cudahy Packing Co.'s Los Angeles plant, not G. E. Richardson, as reported in the October issue of Food Industries.

Dr. G. W. Salisbury, Cornell University, has been appointed head of the department of dairy production, College of Agriculture, University of Illinois. Dr. Salisbury has been associate professor of animal husbandry at Cornell since 1941.

Glen H. Schafer, formerly chemical engineer with Armour Research Foundation, Chicago, is now chemical engineer in charge of research and development, Chas. A. Krause Milling Co., Milwaukee.

William J. Scheffer has been appointed plant manager of the Deerfield Packing Co., Bridgeton, N. J. The appointment elevates him from the post of farms production manager.

There's a better way to manufacture steam

150 HP Cyclotherm Steam Generator

There is nothing wasteful in discarding an old stoker that is in "excellent" condition, if you install a Cyclotherm* steam boiler in its place. A Cyclotherm soon pays for itself in savings in fuel, labor and replacement of parts.

These savings are made possible through the Cyclotherm patents which control a combustion principle that burns fuel *completely* in the first pass of a two-pass boiler. The fuel is first atomized and then burned in a rapidly revolving highly radiant cyclone of flame which advances slowly through the length of the furnace tube so that heat is radiated intensely and uniformly.

Cyclotherm units operate at 80% efficiency. Conductive to this efficiency, Cyclotherm steam boilers of 80 to 300 HP are equipped with an automatic modulating steam pressure control system which regulates the volume of the flame in response to steam requirements. Firing rates are modulated from 30% to 100% of rated capacity. Units of 10 to 60 HP operate "on-and-off", immediately responsive to thermostat or pressure control, a method equally economical on small boilers.

Cyclotherm will burn gas (natural and manufactured) or oil (from furnace to bunker). Combination units are also available which can be fired with either oil or gas.

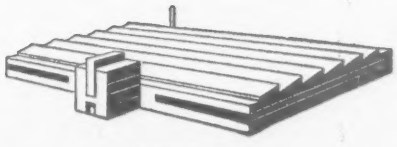
Cyclotherm boilers are manufactured in a range of sizes from 10 to 300 HP with operating pressures from 15 to 200 psi. The steam output range is from 345 lbs. per hour, (with feed water at 212° F) to 10,390 lbs. per hour. If your steam requirements are greater, a battery of two or more Cyclotherms is recommended. Batteries up to eight Cyclotherms are now giving highly satisfactory service.

Cyclotherm is delivered to your door as a complete, packaged unit. All that is necessary to put it to work are four connections — electricity, water, fuel and steam.

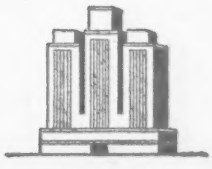
Cyclotherm can now assure you prompt factory delivery.

For further information write for our specially prepared booklet 501Z.

POWER



PROCESSING



HEATING

CYCLOTHERM STEAM GENERATORS

CYCLOTHERM CORPORATION, 90 BROAD STREET, NEW YORK 4, N. Y.

*"Cyclotherm"—the registered trade mark of products of Cyclotherm Corporation

Schwarz Technologist testing reconstituted cooked, dried eggs on the basis of color, odor, flavor and physical condition.

The Objective Viewpoint

An Important Characteristic of Schwarz Laboratory Service

Food and beverage plant executives often prefer to augment their own research and laboratory facilities by applying a fresh, impartial viewpoint to problems arising in their processing or plant operations.

In many instances Schwarz Laboratories, Inc. has been called in to provide this objective outlook. Here are two essential reasons:

Schwarz equipment . . . Our *complete* laboratory facilities enable us to investigate foods and beverages at the maximum speed and economy consistent with the highest standards of accuracy.

Schwarz experience . . . The authoritative knowledge gained in more than 75 years of analyzing a host of food products enables us to analyze and solve your problems more efficiently.

Therefore, Schwarz Laboratories, Inc. are *equipped* and *experienced* to test and analyze your food or beverage at every stage of development—from the selection of raw materials, through processing, to the protection of the finished product through extended shelf life.

Schwarz LABORATORIES INC

Consultation with a Schwarz representative—about any of our services—will involve no obligation on your part.

SCHWARZ LABORATORIES, INC.
202 East 44th St., New York 17, N. Y.

Dr. J. C. Shaw, professor of dairy husbandry at the University of Maryland, is the recipient of the 1947 Borden Award, made by the American Dairy Science Association for outstanding research in dairy production.

John B. Sparks has been re-elected a vice-president of Nestle's Milk Products, Inc., having rejoined the organization at its New York offices after working with the parent Nestle Company in Stamford, Conn., and Vevey, Switzerland, for two years.

Dr. George C. Supplee, president of the research corporation bearing his name at Bainbridge, N. Y., is the recipient of the 1947 Borden Company prize of $1,000 and a gold medal for research in the chemistry of milk.

Robert G. Thomas, formerly with the process and product research division, Owens-Illinois Glass Co., Toledo, Ohio, is now food technologist with the Illinois Canning Co., Hoopeston, Ill.

F. Leslie Toof, for 16 years with Procter and Gamble Co. as chemist and packaging specialist and the first man to develop paper containers for the shipment of shortening, has been named head of the packaging section of the research and products development department, Pillsbury Mills, Inc., Minneapolis. For the past two years, Mr. Toof has been in charge of packaging for the Carborundum Co., Niagara Falls, N. Y.

Dr. Jesse H. White, after 42 years of government service, has retired from his position as executive assistant to the commanding officer, Quartermaster Food and Container Institute for the Armed Forces, Chicago.

DEATHS

Maurice L. Brenner, 44, National Packing Corp., Boston, and former chief of WFA as well as an official and production manager of Seaprice Packing Corp., California, September 5, in Boston.

Swayne Harris, personnel manager, California Packing Corp., San Jose, September 3.

Ray H. Hopper, 56, formerly with Sun Maid Raisin Co. and Libby, McNeill & Libby, Fresno, Calif., September 12.

Rollin E. Jackson, 62, president and owner of Jackson Foods Co., Indianapolis, September 16.

Alex Lion, 72, retired founder of Lion Packing Co., Fresno, Calif., recently.

STABILIZES your pack against *Fat-Rancidity* AT NEW LOW COST!

GRIFFITH'S New CONCENTRATED G-4

Fluid, Oil Soluble Antioxidant

CONCENTRATED G-4 is the newest scientific safeguard against rancidity. Lengthens palatable *shelf-life* and *pantry-life* of your product —easily, *economically!* Non-toxic G-4 requires no pre-mixing . . . *just pour in and stir!* Write for details today.

FOR FLAVOR STABILITY IN ALL SEASONED FOODS

GRIFFITH'S

******Purified* **SEASONINGS**

******Purified* **BINDERS**

Solublized **SEASONINGS**

**U. S. Sterilization Pat. Nos. 2107697, 2189947, and 2189949*

The GRIFFITH LABORATORIES

CHICAGO 9, 1415 W. 37th St. • NEWARK 5, 37 Empire St. • LOS ANGELES 11, 49th & Gifford Sts. • TORONTO 2, 115 George St.

Better foods made possible by Better packaging in . . . . .

Inland Steel Containers

No. 551B8 LEVER LOCKING RING DRUM

No. 5538 STANDARD SHIPPING BARREL

No. 584 LUG COVER PAIL

No. 514X LEVER LOCKING RING PAIL

No. 584R SWIVEL-SPOUT POR-PAIL

No. 594Q CLOSED TOP PAIL

1. **Air tight sealing.**
2. **Positive protection from contamination.**
3. **No leakage.**
4. **No damage in shipping.**

Features of Inland Steel Containers, drums and pails, that enable producers of food products to get the finest in quality to consumers without loss of original freshness, flavor, or color.

There is an Inland Steel Container suitable for every food product.

INLAND STEEL CONTAINER CO.

Container Specialists

6532 SOUTH MENARD AVENUE, CHICAGO 38, ILLINOIS

PLANTS AT: CHICAGO - JERSEY CITY - NEW ORLEANS

Charles Leslie Lowes, 67, former president of General Baking Co., recently at his summer home on Lake Simcoe, Ont.

Harry F. Mathison, 82, for 24 years fruit buyer for Libby, McNeill & Libby, at Yakima, Wash., recently.

Morden Neilson, 69, president and general manager of William Neilson Ltd., and a former president of the Canadian Association of Ice Cream Manufacturers and of the Confectionery, Biscuit and Chocolate Industries of Canada, recently, in Toronto, Ont.

K. M. Renner, professor of dairy manufacturing, Texas Technological College, Lubbock, Tex., recently.

ASSOCIATED INDUSTRIES

American Can Company has announced the purchase of a 46-acre site in Hillside, N. J., for a beer can factory which will be erected with all possible speed to meet the greatly expanded postwar demand of eastern brewers.

Fairfield Laboratories, Inc., Fairfield, N. J., has taken over the Rhodes Chemical Corp., Philadelphia. The Rhodes' manufacture of a complete line of quaternary ammonium compounds will be continued under the new set-up.

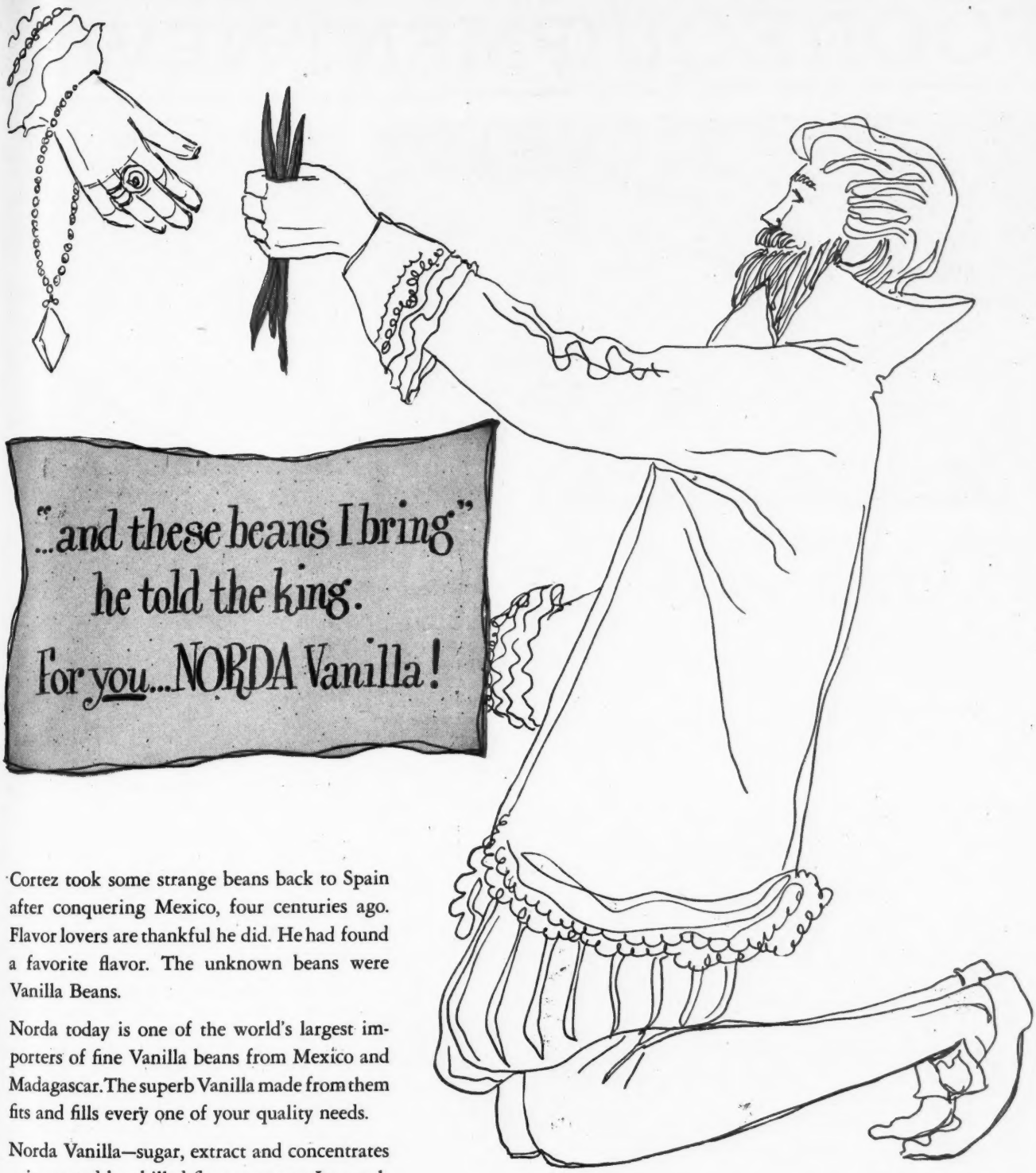
The B. F. Goodrich Co., Akron, Ohio, has appointed Carmen F. Newland as manager of the Kansas City district of the Industrial Products Sales division.

Marathon Corp., Menasha, Wis., is in full production at its new plant housing expanded carton and folding box manufacturing operations. The one-story building, which contains a total of 304,000 sq. ft. of floor space, is constructed of reinforced concrete with brick and concrete exterior in a U-shaped layout.

Monsanto Chemical Co. has opened an office in the Widener Building, Philadelphia, to handle all Monsanto sales with emphasis on organic, phosphate and Merrimac Division products.

Stewart-Warner Corp., Chicago, has appointed Gustave Treffeisen as sales manager of the Alemite distribution division. Mr. Treffeisen has been with Stewart-Warner for 26 years.

Union Bag & Paper Corp. has placed in operation its new corrugated board and box plant at Savannah, Ga. Production capacity of the unit is approximately 5,000 tons of corrugated sheets and boxes per month.



Cortez took some strange beans back to Spain after conquering Mexico, four centuries ago. Flavor lovers are thankful he did. He had found a favorite flavor. The unknown beans were Vanilla Beans.

Norda today is one of the world's largest importers of fine Vanilla beans from Mexico and Madagascar. The superb Vanilla made from them fits and fills every one of your quality needs.

Norda Vanilla—sugar, extract and concentrates—is created by skilled flavor experts. Its excellence begins with the choice beans themselves. The rest comes from Norda's knowledge.

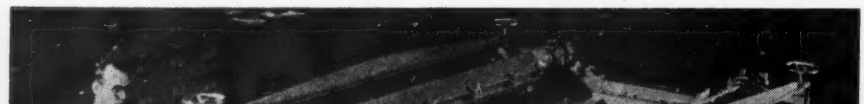
Ask for samples of Norda Vanilla, and the new catalogue of Norda Flavors.

Norda *Essential Oil and Chemical Company, Inc.*

601 West 26th Street, New York 1, N. Y.

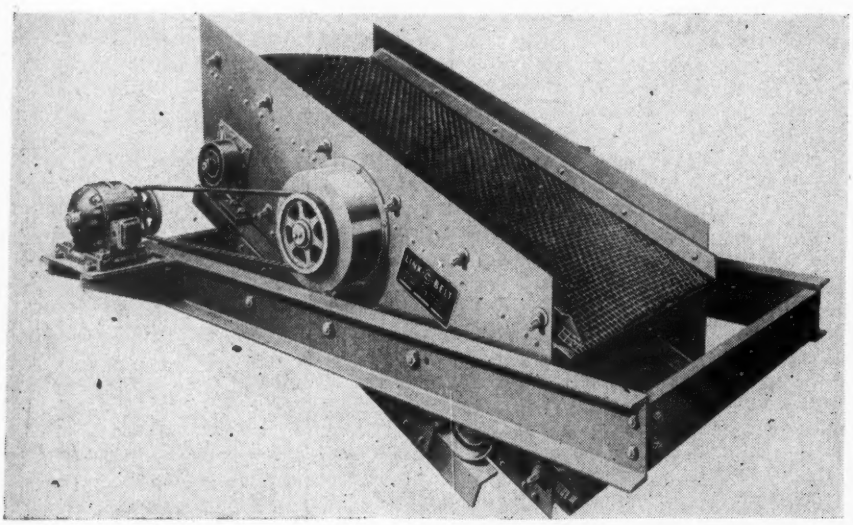
CHICAGO • LOS ANGELES • ST. PAUL • MONTREAL • TORONTO • HAVANA • MEXICO CITY • LONDON

FOOD EQUIPMENT NEWS



Combination Roll Dryer and Flaking Machine 1

A NEW gelatinizing roll, designed for drying and processing starch products containing up to 45 percent moisture content, has been announced by the Allis-Chalmers Mfg. Co., Dept. I, Milwaukee, Wis. A combination drying and flaking machine, the roll can be fitted with a liquid feeder for drying 80 percent moisture material for production of dried milk, dried byproduct of brewer's yeast, dried distiller's protein, baby foods and many other high moisture content products. It is designed for steam pressure up to 225 psi., and is built for unusually high bearing pressures. A power range of 10 to 20 hp. is required to drive the 36-in. diameter by 84-in. long rolls, operating at a range of 5 to 20 r.p.m.

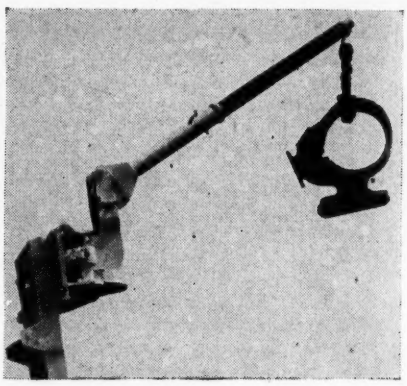


Vibrating Screen 2

A NEW vibrating screen, that can be used for sizing, scalping and dewatering is announced by Link-Belt Co., Dept. I, 307 N. Michigan Ave., Chicago 1, Ill. It is an inclined floor-mounted or spring-and-cable suspended screen with a two-bearing vibrator mechanism which imparts a circular vibrating motion to all points of the screening surface. It is made with double or triple decks and in sizes ranging from 3x8 to 6x14 ft. Lower deck of double-deck screen is removed to make single deck unit.

Labels While It Fills 3

FIL-LABELER, a machine that simultaneously fills and labels 12 or more gals. of wine per min.—with a proportionately high output of ½ gal. and smaller size bottles—is now in production by Biner & Siegrist, Dept. I, Los Angeles 12, Calif. Filling tubes and tanks are of stainless steel. Connecting hoses are of plastic. All moving parts are chrome plated.



Slewing Boom 4

AN interchangeable motorized slewing boom attachment for Automatic fork trucks, with a capacity up to 1,820 lb., a maximum height of 18 ft., 5 in., and a horizontal arc of 120 deg., designed to perform all the usual operations requiring crane-handling equipment, has been developed by Automatic Transportation Co., Dept. I, Chicago 20, Ill. The boom is detachable and may be quickly replaced by standard forks, gooseneck crane, motorized fork carriage, ram or any other similar attachments for standard or specialized handling operations. With only one additional electric motor, the new attachment enables a standard fork truck to perform all the functions requiring four motors on a conventional slewing industrial crane. Vertical lifting is achieved through the truck's regular carriage lift, while forward and reverse movement is effected by the truck's tilt mechanism, as well as by the movement of the truck.

WRITE FOR MORE INFORMATION

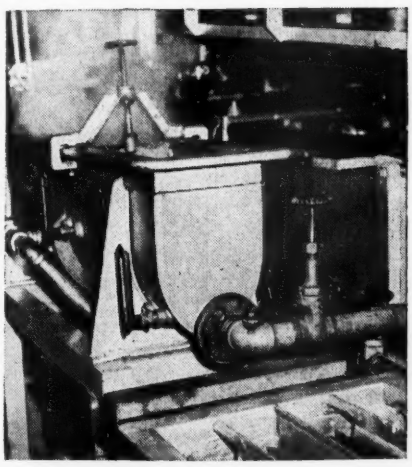
Food Industries Reader Service now makes it easy for you to follow up the news on new equipment and new materials. Tear-out coupon cards are supplied for your convenience on the special colored page which follows the equipment news section in this month's issue. Enter your requests, fill out and mail cards, and let Reader Service do the rest.

Chain Hoists 5

THE Chester Hoist Co., Dept. I, Lisbon, Ohio, announces a new line of high-grade differential chain hoists. Construction features are: Full weight, accurately cast sheave wheels; high tensile malleable iron frames with reinforcing ribs; drop forged heat-treated hooks; special analysis hoist chains, precision made to fit sheave pockets; lower hook mounted on ball thrust bearing for easy alignment of loaded chain to upper pocketed sheave, and swiveling of load. Made in ¼, ½, 1 and 1½-ton capacities.

Special Coated Board 6

GAIRCOTE, a new special coated board for the manufacture of folding cartons, is announced by Robt. Gair Co., Inc., Dept. I, New York 17, N. Y. It bridges the gap between White Patent Coated and the high grade but slow speed brush coated boards. Its use results in ink economies and smoother press operation plus brilliant and exact reproduction.

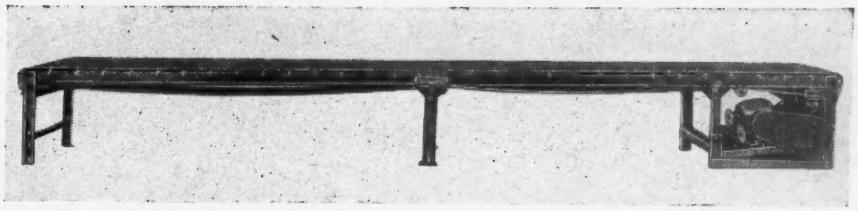


Continuous Jelly Process 7

IMPROVEMENTS in his machine and process for the continuous production of jellies, jams, marmalade and preserves are announced by Dr. G. T. Reich, consulting engineer, Packard Bldg., Philadelphia, Pa. Machines with capacities of 30, 60, 90 and 120,000-lb. per 8-hr. day have been designed, and several of the 60 and 120,000-lb. units are now being built. The machine is compact and consists of 4 units: Preheater; sugar dissolver or mixer; vacuum evaporator and inversion tank. It is provided with automatic controls that make the largest unit operative with two men.

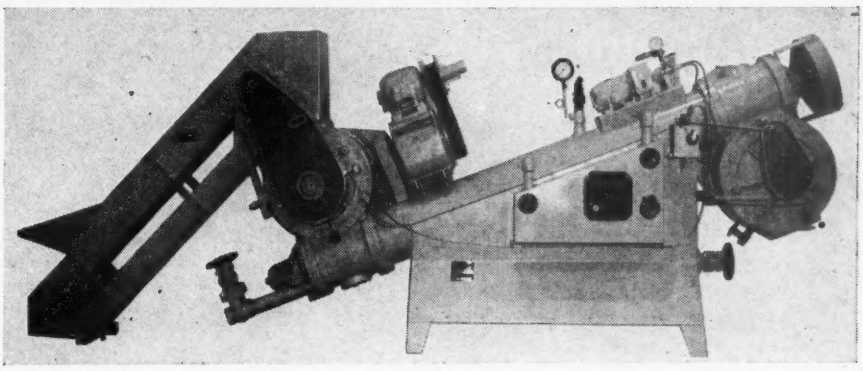
Features of the process are: All parts synchronized for uniform operation; negligible loss of volatile constituents from the fruits because of low temperatures maintained; low steam pressure in heating jacket and easily interchangeable parts for production of jelly or preserves. Designs are available from Dr. Reich.

Illustration shows original open-type unit.



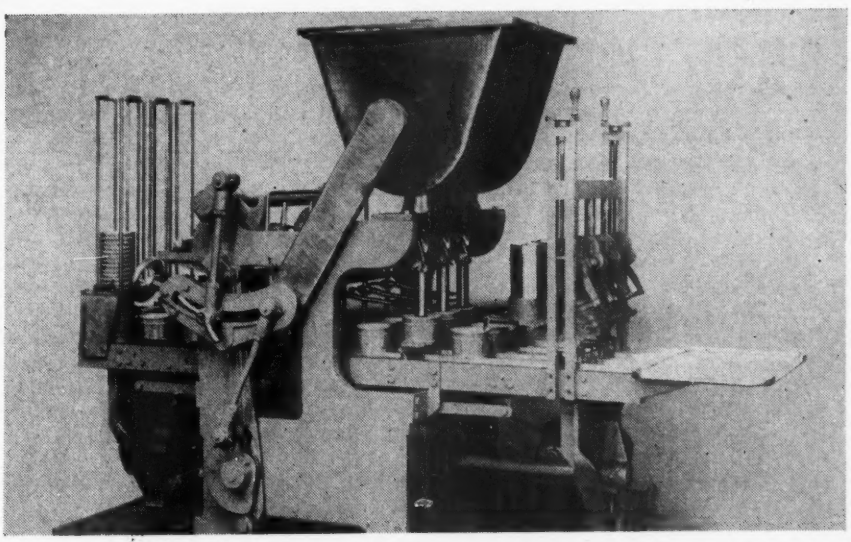
Horizontal Belt Conveyor for Boxes, Cases, Bags 8

THE Standardized Levelbelt, a horizontal belt conveyor, available in lengths from 21 to 161 ft., and in heights of 28, 32 and 36 in., is announced by Standard Conveyor Co., Dept. I, North St. Paul 9, Minn. Drive mechanism is standardized for power up to 1 hp. to operate at a speed of 60 ft. per min. in either direction. A roller type bed is used with ball bearing rollers placed on 8-in. centers. Available with 14 and 24-in. wide belts. Belt tension takeup is incorporated in drive mechanism.



Continuous High-Pressure Steamer 9

A HIGH-PRESSURE steamer with a capacity of from 2 to 6 tons per hr., depending upon the condition and type of vegetables being processed, is made by Food Machinery Corp., Dept. I, San Jose, Calif. Designed as part of a complete processing line for loosening the skins of certain vegetables and fruits, the steamer is said to produce greater yields than other methods. Overpeeling losses are said to be reduced because of the controlled heat penetration. Size of unit, 17 ft. 8 in. long, 42 in. wide, 6 ft. 8 in. high.



Cottage Cheese and Similar Products Filler 10

HOPE MACHINE Co., Dept. I, Philadelphia 14, Pa., is making a machine to fill cottage cheese, potato salad, whipped butter, sour cream, relish and other items of similar consistency into paper cups. Filler hopper is equipped with a paddle type power-driven agitator. Filling valves are equipped with a "No Container—No Discharge" feature. Adjustable to fill carton with quantities from ¾ to 32 oz. The machine may be adapted to handle glass jars, in which case it is equipped with automatic infeed and discharge conveyors. All contact parts are made of stainless steel.

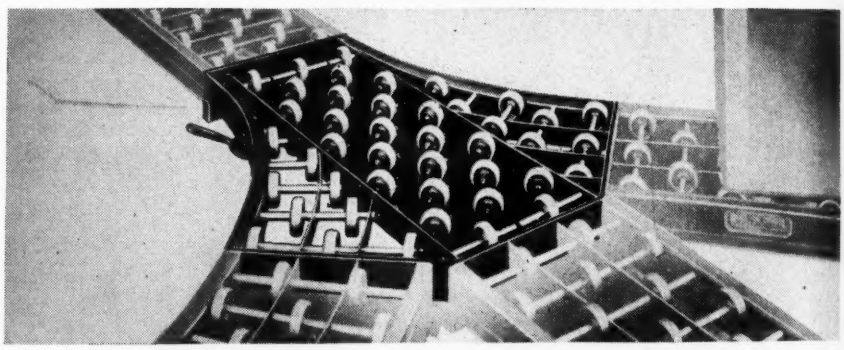
the
BROOKFIELD
synchro-lectric
VISCOMETER
is
rapid
sturdy
simple
accurate
portable

Send for Bulletin giving complete information and description.

BROOKFIELD
ENGINEERING LABORATORIES, INC.
Dept. F, 2 Porter St., Stoughton, Mass.

Helps Packaged Products Retain Freshness 11

FRUITS and vegetables retain their dewy freshness longer when wrapped in Lumarith because it allows them to breathe oxygen and exhale damaging CO_2. This transparent cellulose acetate material is odorless, tasteless and waterproof. It does not shrink or pull the container out of shape. The expelling of excess moisture and gases not only keeps the package neat and clean in appearance, but also helps eradicate early product deterioration; helps prevent vegetable souring. Lumarith is made by Celanese Corp. of America, Dept. I, New York 16, N. Y.



Conveyor Switch Provides Flow in 3 Directions 12

A 3-WAY switch for roll-or-wheel conveyors which can be instantly adjusted to provide flow in any of three directions—left, right and straight ahead—has been introduced by the E. W. Buschman Co., Inc., Dept. I, Cincinnati 32, Ohio. Accurately aligned "pivot" wheels integrated by a simple, trouble-free arrangement of levers controlled at a single point, pick up the part or package from the conveyor and change its direction as desired. The pivot wheels are raised slightly above the level of the wheels in the spin portion of the unit to eliminate any drag in the switching operation. Packages move in the selected direction without manual guidance. The switch weighs only 56 lb. and is stated to be simple in construction, ruggedly made, and requires no maintenance or adjustment.

Polyethylene Pipe 13

POLYETHYLENE pipe and fittings, screw type, in sizes from ½ to 2 in., are soon to be available from American Hard Rubber Co., Dept. I, New York 13, N. Y. They are insoluble in all common solvents at temperatures up to 125 deg. F. At normal temperatures the threaded fittings will withstand pressures up to 50 lb. per sq. in. without leakage.

Powered Dumbwaiters 14

A COMPLETE line of power-driven, all welded steel dumbwaiters, with a lifting capacity of 500 lb. and equipped with Cutler-Hammer controls, is now in production at the Sage Equipment Co., Dept. I, Buffalo 2, N. Y. A wire-rope drive provides a lifting speed of 40 ft. per min. for the 3-ft. x 3-ft. platform. Wall brackets and rails are included as standard equipment.

Do these "gremlins" give you wrapper trouble?

Moisture or grease is at the bottom of most wrapper trouble. Even when there's just a little, it has a way of working into the wrapper causing weak spots, leaks, and messy stains. A way to avoid this trouble is to use wrappers of Patapar* Vegetable Parchment. Grease and moisture don't have a chance with Patapar.

Patapar has wet-strength —resists grease, too

Patapar is famous for its wet-strength. It can take any amount of drenching, soaking—even boiling—and remain strong.

Where there's grease, fats or oils, Patapar resists penetration. It makes a clean, neat package—and really gives protection.

Irresistible appeal

Patapar's rich white texture adds distinction and sales appeal to whatever is wrapped in it. When color is wanted, Patapar can be printed beautifully with brand names and attractive designs. We print Patapar economically in our own plants in one or more colors by letterpress or offset lithography.

When you order printed Patapar, we'll include the Keymark at no extra cost. The Patapar Keymark is the nationally advertised symbol of wrapper protection. When women see it on a wrapper, it reminds them the product inside is well protected.

*Reg. U. S. Pat. Off.

Paterson Parchment Paper Company • Bristol, Pennsylvania

Headquarters for Vegetable Parchment Since 1885

WEST COAST PLANT: 340 BRYANT STREET, SAN FRANCISCO 7, CALIFORNIA

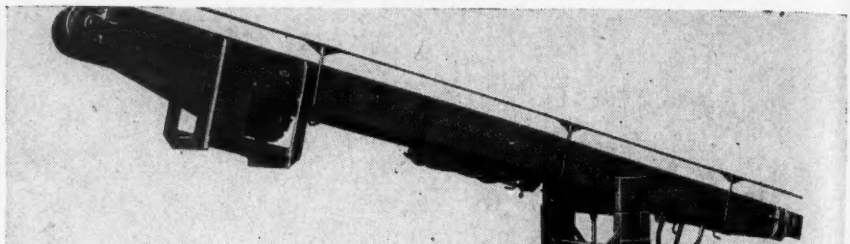
BRANCH OFFICES: 120 BROADWAY, NEW YORK 5, N. Y. • 111 WEST WASHINGTON ST., CHICAGO 2, ILL.

Hundreds of food processors are already enjoying the benefits of this fine new belting in their plants.

** PlasTex is the registered trade name for Buffalo Weaving & Belting Company's plastic-covered belting. Makers also of RF & C (rubber covered), solid-woven cotton, and glazed (nitro-cellulose coated) beltings.*

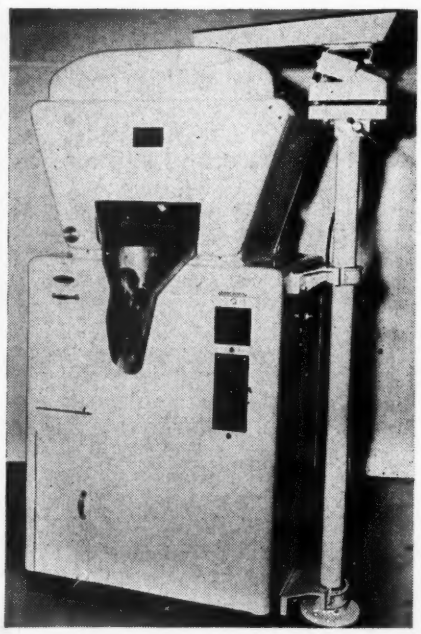
Get the whole *PlasTex* story, and a free sample. Write today!

BUFFALO
WEAVING & BELTING CO.
231 Chandler Street
Chicago • Buffalo 7, N.Y. • New York



Booster Conveyor Is 15 Ft. Long 15

THE Harry J. Ferguson Co., Dept. I, Jenkintown, Pa., announce their new "Streamliner" 15 ft. booster. This unit has a 15 ft. long bed raised and lowered by a hydraulic jack. Mounted on casters for easy mobility, it is equipped with floor locks to prevent creeping while in operation. Unit comes equipped with gear-head motor, adjustable guard rails, start-stop reverse switch and electrical cord. There is an off-on switch at the top of the booster to allow the stacking man to stop the operation.



Air-Fuel Ratio Control 17

COMPLETE L&N temperature and combustion control systems for large industrial furnaces now include a new air-fuel ratio controller which has the features of simplicity, accuracy and sensitivity. It is a rugged, balance-type instrument, having ample flexibility to meet any operating condition. Its ratio can easily be adjusted manually for operation with fuels of various B.t.u. content. As fuel flow changes, the instrument maintains air-fuel ratio constant at the desired control point. Or it can provide automatic variation of ratio, increasing or decreasing the percent of air at reduced fuel flows. Controller is made by Leeds & Northrup Co., Dept. I, Philadelphia 44, Pa.

Automatic Weigher 16

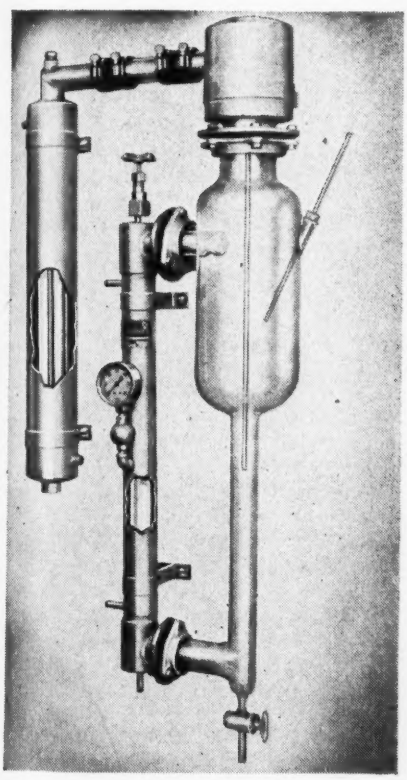
To speed the operation of weighing dry products for packaging, Wright's Automatic Machinery Co., Dept. I, Durham, N. C., has developed an improved automatic weighing machine. Called Hy-Tra-Lec, Model C, the weigher has a range of 2 oz. to 16 oz., and operates without a fulcrum point or weight beams. Material to be weighed is fed continuously into the machine's vibrator feed by an overhead hopper or conveyor. Product flows from the feed into a receiving bucket, is weighed and discharged ready for packaging. Working volume of receiving bucket, 350 cu. in. Handling of the container may be automatic or manual, depending upon the product and container. Power is supplied by a 1/12 hp., 110 v., 60 cycle, single phase a.c. motor.

Scotch Tape Box Sealer 18

A BOX-SHAPED device for sealing cartons and packages semi-automatically with either "Scotch" cellulose tape or "Scotch" locker tape is announced by Minnesota Mining & Mfg. Co., Dept. I, St. Paul 6, Minn. It is operated by sliding a package across the flattened top of the sealer. The sliding package moves a roller arm which applies and cuts the tape, and cocks the device for the next package. No electric power is required.

Staling Retarder 19

ALDO 33, a highly efficient bread and cake staling retarder, that, besides keeping these products fresh and soft for an extended time, enhances their overall quality and conserves basic materials, is announced by Glyco Products Co., Inc., Dept. I, Brooklyn 2, N. Y. Aldo 33 is the trade name of Glyco's edible glyceryl monostearate. It is distinguished by its fine granulated bead form which permits mixing with other ingredients with minimum expenditure of processing effort and time. Another important attribute is the fact that the baker is not restricted to any particular brand or type of shortening. Further distinguishing characteristics are its potency in achieving complete homogenization and emulsification, and the absence of variable mixtures. In cake baking, it is possible to replace 15 to 20 percent of the shortening and the bread baker may replace 30 to 66⅔ percent of the shortening when Aldo 33 is added as a dry ingredient.



Laboratory Evaporator 20

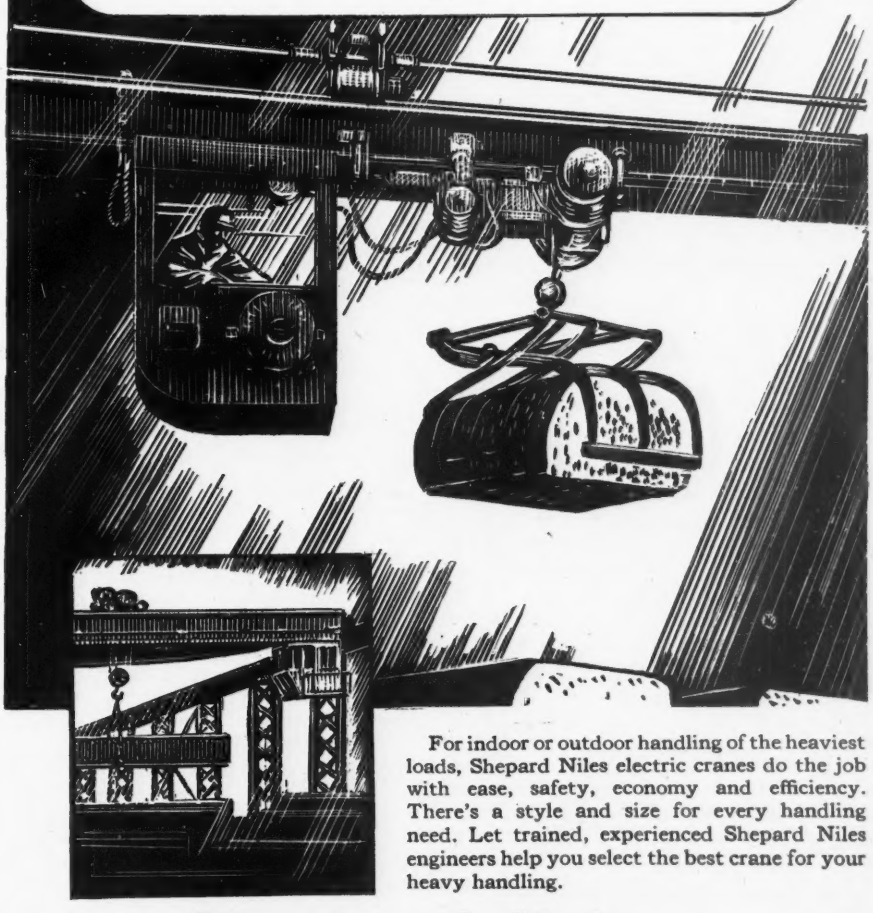
A LABORATORY evaporator, which is constructed on the same principles as large evaporators to bridge the gap between pilot plant and small laboratory apparatus, is made by Precision Scientific Co., Dept. I, Chicago 47, Ill. All parts are constructed of Pyrex glass or 18.8 stainless steel. The glass evaporator body is made in one piece. Steam chest will stand pressures to 150 psi. Will handle batches up to 3 liters; 12 liters of water per hr. can be evaporated. It can be modified for continuous feed. Net weight 50 lb. and can be mounted on a wall with integral brackets.

Need A Railroad In Your Plant?

When you install a Shepard Niles monorail hoist you have your own private railroad to lift heavy loads, move them to other parts of the plant and deposit them where needed.

America's oldest builder of electric hoists and cranes has a style and size of monorail hoist for every handling operation from ⅛ to 20 tons. Trained, experienced Shepard Niles engineers will gladly survey your material handling problems and recommend, without obligation, the best style of monorail hoist to do the job. With over 5,000 styles and sizes from which to choose, there's bound to be one to suit you.

Shepard Niles monorail hoists, whether floor or cab operated, work economically and efficiently, year after year. When a Shepard Niles does the work there's no tired muscles, no absenteeism.



For indoor or outdoor handling of the heaviest loads, Shepard Niles electric cranes do the job with ease, safety, economy and efficiency. There's a style and size for every handling need. Let trained, experienced Shepard Niles engineers help you select the best crane for your heavy handling.

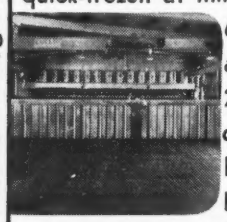
Shepard Niles
CRANE & HOIST CORPORATION
422 SCHUYLER AVE., MONTOUR FALLS, N. Y.

Pratt & Whitney Keep This Room at 68° F. the Year 'Round.

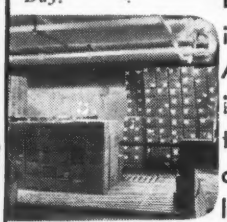
Hold Any Temperature You Want with

FRICK Refrigeration

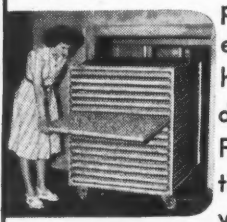
"Cold" down to 130 degrees below zero F. is now common in research and test work. Penicillin is dried at minus 75. Foods are quick-frozen at minus 30 to minus 60; are stored at zero to minus 20. Ice is frozen commercially in brine at 16. Fresh foods are held at 34 to 36. Drinking • water is cooled to 45. Air conditioning, at 70 to 85, tops the scale of refrigerating loads. • Whatever the temperature wanted, you can hold it most dependably with Frick Refrigeration. Sixty-five years' experience says so!



One-man Ice Plant Makes 42 Tons a Day.



Frozen Foods Stored at Minus 10° F.



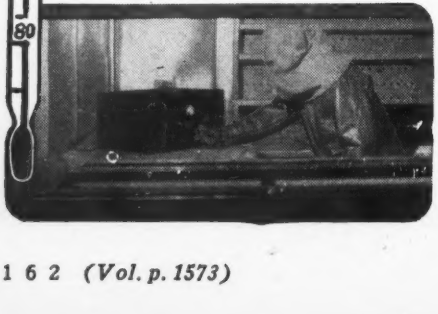
Frick-Freezer Held at Minus 35° F.

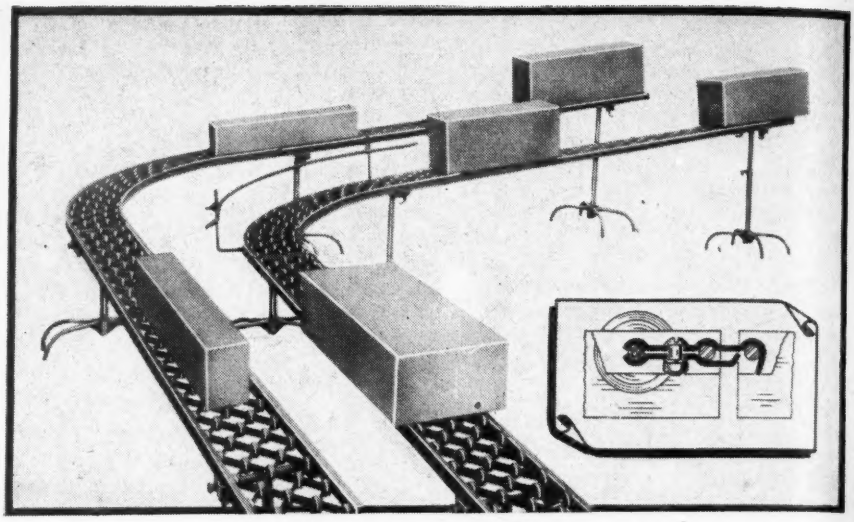
DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA., U.S.A.

Testing at Minus 76° F. in Refrigerated Laboratory of Bendix Radio.



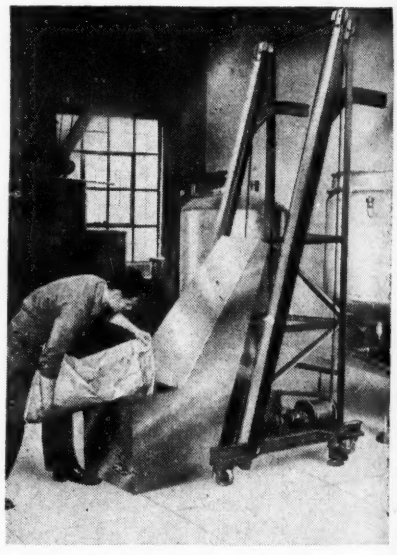


Gravity Conveyor Made Entirely of Aluminum 21

EASE in handling and light weight are the claims made for an all-aluminum Load-Veyor conveyor announced by Market Forge Co., Dept. I, Everett 49, Mass. A 10-ft. section of the conveyor weighs only 30 lb. A similar length of steel conveyor weighs 58 lb. The conveyor also has the advantage that both sides may be used. For large packages the side is used with the wheels projecting above the side rails. For narrow packages the opposite side, with the wheels below the side rails, is used. Side units then act as guides. Being non-rusting it is excellent for outdoor use.

Air Separator 22

A SEPARATOR for delivering clean, dry steam, gas and air at rates up to 250 c.f.m., is announced by the Chicago Mfg. & Distributing Co., Dept. I, Chicago 9, Ill. The separators are strictly mechanical in operation, containing no screens, filters, felt or wool, and no moving parts. They require no attention whatsoever other than draining off condensation that accumulates in the chamber. Size, 8 in. dia., 15 in. high, with 1½-in. standard pipe connections.



Adjustable Floor Drain 23

To solve drainage problems caused by variations in floor levels, the Josam Mfg. Co., Dept. I, Cleveland 14, Ohio, has developed the Leveleze floor drain with an adjustable top. If for any reason it should become necessary to change the height of the drain after installation, the top may be elevated or lowered. Available in cast iron, lacquer finish or galvanized; or cast iron body with brass top and grate, or all brass or Everdur.

New Deodorant 24

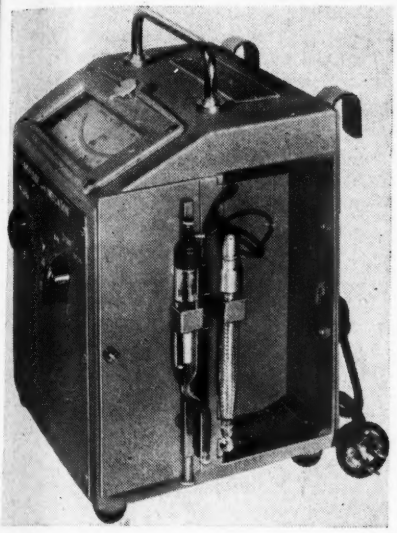
A NEW kind of deodorant that actually destroys odors instead of concealing or masking them has been developed by Rohm & Haas, Dept. I, Philadelphia 5, Pa. The material is a quaternary ammonium compound, known as Hyamine 1622. It can be used effectively against such odoriferous materials as garlic, onions, spoiled potatoes or decayed fish. Since it is used to kill germs and bacteria, it is effective in eliminating any kind of bacteria-induced putrefaction.

Dumps Solids, Liquids 25

FOR lifting and dumping free flowing materials, such as sugar, flour, nuts, fruits, powdered or liquid milk, chocolate or light industrial products, the Colson Equipment & Supply Co., Dept. I, Los Angeles 13, Calif., has developed the Cresco Dumper. It is equipped with a 500-lb. capacity box type skip for loose materials or liquids, or an open front skip for bagged materials. Material is placed in the skip, a switch is turned, and the skip is automatically lifted and the material emptied into a bin, kettle or other receptacle. The manufacturer claims that 100 trips per hr. are possible. Floor space required, 36x65 in. Mounted on 5-in. ball-bearing swivel casters. Built in four dumping heights: 5, 6, 7 and 9 ft.

Sediment Tester 26

THE new Parsons cream sediment tester, developed and approved by the American Butter Institute, is announced by Cherry-Burrell Corp., Dept. I, Chicago 6, Ill. Designed for permanent mounting on a wall, it uses filter material from a reel instead of individual disks. Each reel contains 50 ft. of material—sufficient for 300 individual tests.



Portable pH Meter 27

A DIRECT-READING pH meter for a wide variety of production applications, as well as for routine laboratory use, is announced by Cambridge Instrument Co., Dept. I, New York 17, N. Y. Overall accuracy is 0.1 pH, range 0 to 14. Operates from any 110 volt, 50 or 60 cycle a.c. outlet. The instrument is compactly housed in a sturdy metal case specially designed to stand up under plant use. Its size is 7 x 8½ x 11¼ in., its weight only 10 lb. Hooks on the back of the case permit suspending the meter over a vat or tank, mounting from a wall or hanging from a rack. For special applications an extension electrode assembly and extra length lead wires can be furnished.

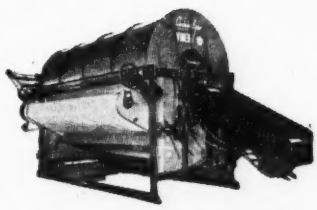
For routine applications the electrode assembly is mounted inside a door flush with the side of the instrument case. Opening the door brings out the electrodes ready for use. Closing the door moves the assembly back into its compartment inside the case. Clips at the rear of the compartment hold safely in place the bottles of buffer and KCl solutions furnished with the meter.

Roll Printer 28

A 2-COLOR narrow web roll printer that will print on any kind of stock that can be fed from a roll, using either rubber or metal plates, having good register at tremendous speeds, is made by Frostad Engineering Co., Dept. I, Milwaukee 7, Wis. It is manufactured in two sizes for standard printers' or quick-drying aniline ink.

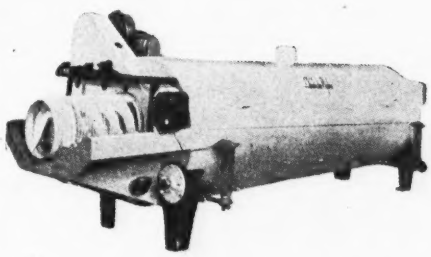
PROCESSING PEAS AND LIMAS by CRCO

A perfectly synchronized line for peas or lima beans without slow-downs at any point is possible with CRCO equipment. Each unit is designed to operate at the same speed and efficiency and, because of careful engineering and design, there is a remarkable freedom from costly brakdowns.



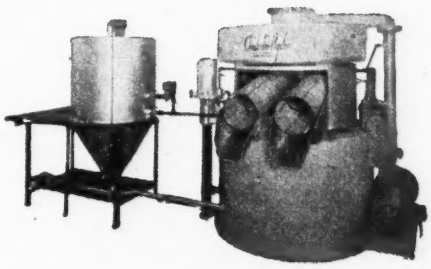
STEEL FRAME VINER

CRCO Offers three exclusive features in the Model 1635 Viner—constant speed drive to the Viner—variable speed drive to the Beating Cylinder—and the Adjustable Beater Cylinder. These give the operator complete control of the product under all threashing conditions and prevents splits or loss of peas in the straw.



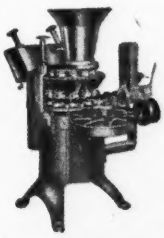
SANITARY BLANCHER

In the CRCO Sanitary Rotary Blancher steam and water are automatically and positively controlled throughout the entire length of the Blancher . . . resulting in a material saving of labor, steam and water. The absolutely automatic maintenance of blanching time and temperature is particularly important—either in canning or freezing.



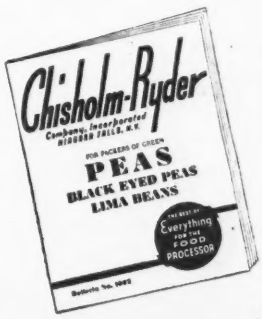
QUALITY GRADER

The CRCO Quality Grader with Gravometer and Brine Mixer is the fastest, most efficient and most economical method of grading peas or lima beans according to their tenderness, thus enabling the packer to secure a greater return by separating the poorer quality from the more profitable grades. The separation desired is secured by varying the density of the brine solution.



FILLER

CRCO - Ayars Pea Fillers are available in various capacities with regular or double briners.



Send for Catalog No. 1060, illustrating lines and equipment for peas and lima beans.

THE BEST OF Everything

CHISHOLM-RYDER CO. INC.
Niagara Falls, New York
FOR THE FOOD PROCESSOR

Chisholm-Ryder Company of Pennsylvania
AN AFFILIATE

Ayars Machine Company
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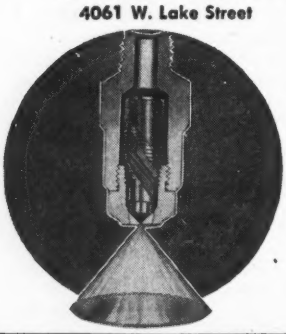
(106)

Meet Us at the Atlantic City Convention January 16 to 21

FOR LOWER SPRAYING COSTS

Surprising as it may seem, spray nozzles alone are often a highly important element in the efficiency of a process or operation involving spraying. Spraying Systems can provide Spray Nozzles that offer two important advantages: (1) design based on a specialized experience in spray nozzle engineering and (2) wide range of sizes to obtain characteristics such as capacity and degree of atomization that meet specifications exactly. Write for Catalog No. 22 . . . gives complete information.

SPRAYING SYSTEMS CO.
4061 W. Lake Street • Chicago 24, Illinois



Atomizing Nozzle for Evaporative Cooling

Uniform distribution of atomized spray provides efficient cooling of cans and jars after processing. Available in wide range of sizes for every requirement.

SPECIALISTS IN SPRAY NOZZLE DESIGN AND MANUFACTURE

SKIN IRRITATIONS?

Let Us Help You!

If skin irritations are a problem in your plant let us send you a trial quantity of Tarbonis. In literally hundreds of plants Tarbonis has proved a real help not only in overcoming skin irritations that have occurred, but also in guarding against their recurrence. Pleasant to use—easy to apply—sure of workers' cooperation. Does not interfere with the work to be done. Use the coupon . . . now.

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Are These the Irritants?

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Chemicals
Urea and Phenol
Plastic Compounds
Brine
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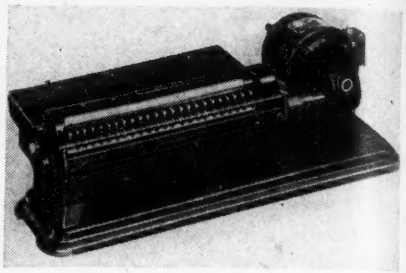
Foodstuffs
Chemicals
Reagents
Naphtha
Soaps
Detergents



Label Gummer 29

FOR companies who have no need for large type labeling equipment, or for those who have only small runs, Diagraph-Bradley Industries division of the Diagraph-Bradley Stencil Machine Corp., Dept. I, St. Louis 8, Mo., announces production of their motor-driven Stikfast label gummer. It takes labels in any length and up to 8½ in. in width, and has an adjusting screw for determining the amount of glue that is put on the back of each label. The machine will use glass glue, tin glue, or other adhesives. It is hand-fed, with the label passing between two rollers. A 1/20-hp. motor, back-geared with gear reducer built right into the motor, is featured on the unit. A patented slip coupling assures direct drive, and yet provides quick detachment of the label gummer from the motor for cleaning.

Cores and Trims Fruits 30

A NEW hydraulically operated device for coring and trimming fruits and vegetables, that steps up the output per woman on a coring and trimming line from 50 to 300 percent, is announced by Magnuson Engineers, Dept. I, San Jose, Calif. Comprised of a water turbine, upon the center of which is mounted a knife, the Hydrout, as it is called, is covered with a rubber diaphragm. Rotation of the turbine and the knife is easily regulated by the water pressure. Developed originally as an onion rooter, canners and packers are now using it with excellent results for coring tomatoes and for coring and trimming pears.

CATALOGS, BULLETINS

This digest of manufacturers' new publications is offered by FOOD INDUSTRIES Reader Service as a convenience for executives. The editors feature catalogs, data sheets and technical pamphlets likely to interest purchasing agents, superintendents, packaging men and food technologists.

Food Plant Equipment

Candy Wrapping Machines.....51
Package Machinery Co. — 6-page folder, "Forgrove Candy Wrapping Machines." Illustrates and describes eight models of machines for plastic and foil fold and twist wrapping of candies. Contains specifications of each model.

Pressure Leaf Filters.....52
Niagara Filter Corp. — 15-page, 2-color illustrated booklet giving complete data on pressure-leaf filters, for use in the food, chemical, fermentation and process industries. Contains flow diagrams illustrating the principles of pressure filtration using filter aids, and a table of sizes, capacities, and dimensions of standard models of Niagara pressure-leaf filters.

High Speed Labeler.....53
Economic Machinery Co. — 6-page folder, "The World Tandem Labeler." Profusely illustrated with photographs and line drawings. Contains full descriptions of this machine which will operate at any rate from 75 to 300 bottles per min.

Sanitary Pipe and Fittings.....54
Cherry-Burrell Corp. — 20-page, 2-color catalog "Sanitary Pipe and Fittings—for the Dairy and Food Industries' contains photographs, line drawings and dimensions of this company's complete line of sanitary fittings. Also instructions on assembling sanitary pipe and fittings and producing expanded joints.

Dewatering Machinery 55
General American Transportation Corp. — 8-page illustrated booklet No. 55 describes Louisville continuous thickening screens, screw type dewatering machine and continuous roller type dewatering press.

Variable Speed Drive.....56
Reliance Electric & Engineering Co. —4-page bulletin No. 311-A covering the company's all-electric adjustable speed drives in the 40-200 hp. range for broader application of its stepless speed changes.

Air Cooling Units.....57
Buildice Co., Inc.—Bulletin No. A-100 illustrates and describes the company's brine spray air cooling units. Also 4-page folder illustrating and describing Buildice "Sweetwater Coolers."

High Vacuum Pumps.....58
Beach-Russ Co.—16-page catalog No. 84. Illustrated with exploded views and photographs of this company's complete line of high vacuum pumps. Contains capacity charts, a chart on "How to Determine the Pump Size," and a table of capacities and dimensions.

Elevating Tables 59
Lyon-Raymond Corp. — New 8-page bulletin No. 231, describing their line of portable hydraulic elevating tables. Full information on the various models is given, and photographs are reproduced showing the table in actual use for work positioning, loading trucks and other jobs.

New Slurry Pump.....60
Pettibone Mulliken Corp. — 16-page bulletin on their new slurry pump whose wear parts are centrifugally cast of abrasion-resistant Diamond

alloy. Complete detailed description, engineering and pumping data, selection chart, dimensions, assembly drawings and parts list are included.

Process Equipment 61
The Duriron Co., Inc.—8-page general catalog describing every type of corrosion resistant equipment produced by the company.

Food Equipment 62
A. B. Farquhar Co.—New food equipment catalog showing hydraulic juice presses, the new continuous coolers and pasteurizer-coolers for glass-packaged foods, sorting and trimming tables, hi-pressure cleaning units and material handling conveyors.

Top Sealing Machine.....63
Battle Creek Bread Wrapping Machine Co.—4-page illustrated folder on Model T-60 top sealing machine for automatic synchronization with preceding bottom and sealing operations.

Rotary Sifter 64
B. F. Gump Co.—12-page catalog No. 101, Section "S" describes and illustrates Bar-Nun rotary sifters for use in processing such materials as baking powder, various spices, corn products, powdered eggs, gelatin, powdered milk, oat meal, potato flour, rice, starch, salt, soy bean products, sugar, tapioca, wheat and yeast products.

Coolers 65
Bush Mfg. Co. — 16-page illustrated catalog, "Bush Heat Transfer Products," describes walk-in box coolers, ice making coils, unit and panel coolers, water defrost unit coolers, auto-defrost and replacement air cooled condensers.

Zeolite Softeners 66
Cochrane Corp.—New 20-page Publ. 4345 on the green sand zeolite softening process and its own zeolite softening equipment. Applications to boiler feed, water-jacketed equipment, and processing in specific industries such as food canning are briefly described.

Steam Engines 67
Troy Engine & Machine Co.—Bulletin No. 307 contains 7 pages illustrating and describing the steam engine drives made by this company. Both horizontal and vertical steam engines are shown.

Valves 68
Hanna Engineering Works—New 8-page bulletin gives specifications and operating data on all Hanna valves. The line consists of foot-operated and hand-operated valves for air and hydraulic lines, and speed control valves for use with air and hydraulic cylinders.

Centrifugal Pumps 69
Warren Steam Pump Co., Inc.—4-page bulletin 225 illustrating and describing Warren single stage, double suction, type DB and DBM centrifugal pumps with capacities of 30 to 1,200 g.p.m, in discharge sizes 1½, 2, 3, 4 and 5 in.

Oil-Retaining Bearings 70
A ready-reference "Stock List No. 3" of "Compo" oil-retaining porous bronze bearings carried in stock for immediate delivery has just been published by Bound Brook Oil-Less Bearing Company. Emphasis is placed on the inclusion of many new sizes of sleeve type, flanged and self-aligning bearings. Solid plugs and washers are also listed.

Welding Fittings 71
Tri-Clover Machine Co.—16-page, 2-color illustrated catalog 747 on "Zephyrweld" Stainless Steel Welding Fittings offers clear, concise data on

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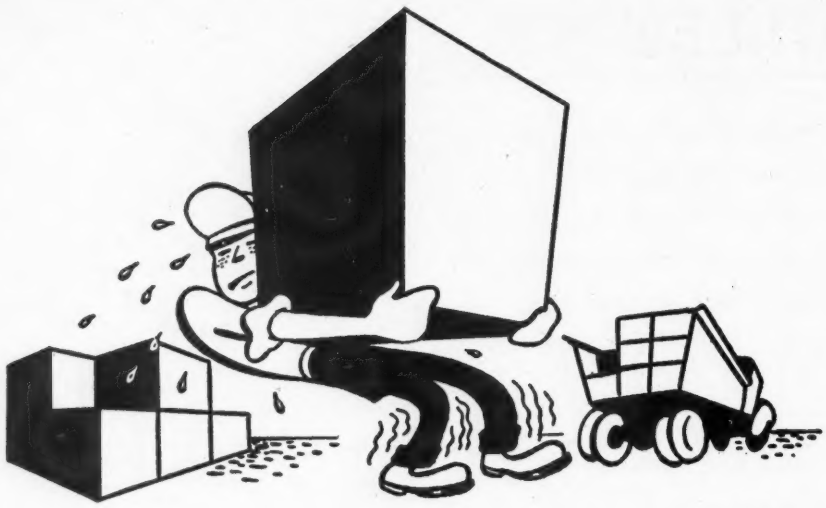


YOUR PROFITS ARE SAGGING
. . . when you move goods by hand

Lifting is hard work. And men engaged in lifting get tired as the day wears on with the result that their productivity takes a nose dive. This is not so with a machine.

The Stevedore, Jr. is a portable Power Belt Conveyor that can make light work of your heavy lifting and stacking operations. With it, one or two men will lift or carry more goods than ten men can lift or carry unaided. Morning, noon and night, the Stevedore, Jr. works steadily without let-up to perform your lifting tasks faster and more economically than can possibly be done by hand.

Stevedore, Jr. can be used in many ways. It can be hooked to a Rapid-Wheel Gravity Conveyor Line (as shown) and used to carry goods long distances onto truck or freight car. Being portable, it can be moved to the job for loading, unloading and stacking operations. It plugs into any light socket, carries up to 200 pounds of distributed load at 65 feet per minute and can be adjusted to any angle.

Have you a material handling problem?

Send your handling troubles to Rapids-Standard for solution.

OFFICES IN PRINCIPAL CITIES

Manufacturers of

STEEL FORGED CASTERS · TRUCKS · CONVEYORS · POWER BOOSTERS

The Rapids-Standard Co., Inc.

Sales Division—361 Peoples National Bank Bldg., Grand Rapids 2, Michigan

such subjects as physical characteristics, fabrication, and adaptability of welding fittings to other fitting types; stainless steel analysis tables; bursting pressure data, and complete information covering the methods in which light gage commercial tolerance stainless steel tubing to provide lightweight corrosion-resistant liquid lines.

Process Machinery 72
Sprout, Waldron & Co.—8-page bulletin SCEC illustrating and describing process equipment manufactured by this company.

Materials Handling

Chain Conveyors 73
The Island Equipment Corp.—2-color, 16-page bulletin on their P-C18-1A-1, Ultimate Double-Flex chain conveyor for the economical and prompt handling of cases, cartons, boxes and cans. It is filled with diagrams, floor plans, layouts and installation views.

Fork Truck 74
Crescent Truck Co. — New 6-page folder illustrating and describing the new Crescent aisle saver Palletier.

Lift Trucks and Cranes.....75
Hyster Co.—Condensed lift truck catalog No. 1074 pictures, describes and lists specifications on the complete line of Hyster gas powered lift trucks, straddle trucks and mobile cranes.

Gravity Conveyors 76
Harry J. Ferguson Co.—11-page bulletin 100, "Streamliner Gravity Roller Conveyors," describes, with illustrations, the full line of roller conveyors, conveyor stands and special units made by this company.

Lift Truck Guide.....77
Towmotor Corp.—28-page pocket size guide for selection of the correct fork lift truck or accessory for any materials handling job. Contains illustrations and drawings of a complete line of Towmotor materials handling equipment, together with a list of important specifications for each model.

Conveyors 78
The Rapids-Standard Co., Inc.—4-page educative bulletin on material handling in the frozen food industry.

Control Equipment

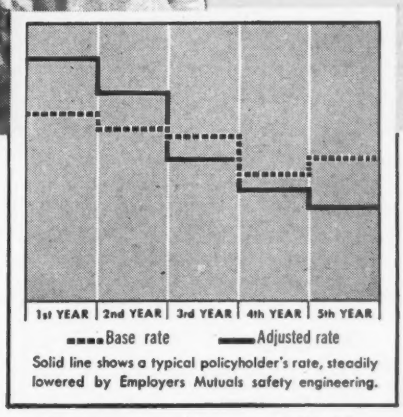
Spectrophotometer 79
Wilkens-Anderson Co.—8-page illustrated bulletin No. B-211 on Coleman Junior Spectrophotometer with new interchangeable scales.

Air Operated Controllers.....80
The Brown Instrument Co.—40-page catalog No. 8905, "Air Operated Controllers," contains valuable information on instruments for the automatic control of industrial processes. Many photographs, schematic drawings and diagrams illustrate the construction and principles of operation of all instruments described.

Electronic Scriber 81
Wheelco Instrument Co.—8-page, 2-color bulletin, C-2, contains design, operating and specification data pertaining to the new Wheelco Capacilog.

CO_2 Volume Tester 82
Schwarz Laboratories, Inc.—New bulletin describing the air and CO_2 volume tester which has been recently developed for brewers and beverage

This is the type of press guard which provided the protection described herein.



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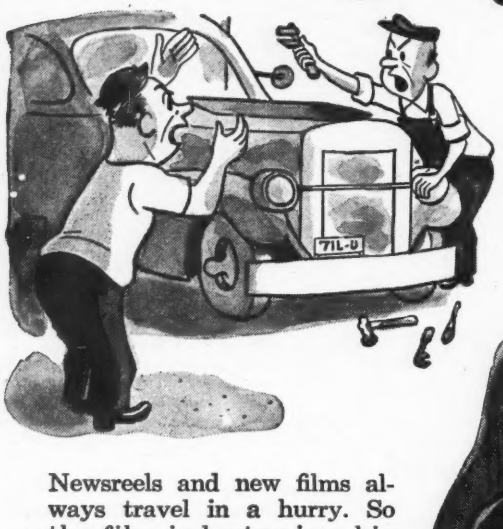

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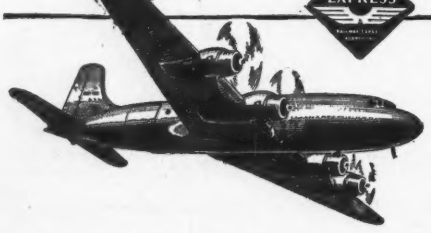

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manufacturers and bottlers. Illustrations include a view of the complete setup of the tester in use and an exploded view showing all the parts in proper relationship with each other.

Metal Filter Cloth 83

Cambridge Wire Cloth Co.—4-page illustrated folder on metallic filter cloth and panels for vibrating screens.

Plant Supplies

Stop Leak 84

Flexrock Co. — Broadcast on Flextite—the liquid chemical that stops leaks in concrete, masonry or brick walls or foundations.

Sanitizing Material 85

Oakite Products, Inc. — Illustrated booklet describing successful applications of Oakite Bactericide for: General disinfection; chemical sterilization of food processing, dairy, bottling, baking, brewing and other equipment; sanitizing walls and other surfaces for the removal of mold growth and deodorizing.

Emulsified Asphalts 86

American Bitumuls Co.—8-page bulletin on "Laykold" emulsified asphalts used in cold insulation construction. Describes, with line drawings and photographs, the design of insulated cold space, ceiling, wall and floor insulation, and products for cold insulation.

Silicone Oils 87

Dow Corning Corp.—Data sheet A-20-1 concerning a series of silicone lubricating oils which have exceptional heat stability combined with high resistance to oxidation, freedom from gumming, water repellency, low volatility and high flash points.

Food Plant Floors.....88

The Creamery Package Mfg. Co.—4-page folder "Emery Aggregate Floors —Long Lasting, Non-Slip, Acid Resistant." Describes the types and sizes of emery aggregate, recommended uses and installations. Lists users.

Miscellaneous

Bad Lighting 89

The Edwin F. Guth Co.—New "Rainy Night" booklet emphasizes the importance and value of good lighting by pointing up the effect of bad lighting.

Bung Wrench 90

Ampco Metals, Inc.—Envelope size, illustrated folder describing all-purpose bung wrench which opens 15 different closures in kegs and barrels.

Fire Fighting 91

American-LaFrance-Foamite Corp.—4-page folder describing "Pentrate," a new product for making water wetter.

Quality Control 92

North American Philips Co., Inc.—8-page booklet on quality control illustrated with drawings and tables.

Mineral Wool 93

Industrial Mineral Wool Institute—2-color, 24-page manual, "Holding Low Temperatures with Better Insulation." Contains 15 photographs, 11 diagrams, 7 charts and tables, and analyses of case-history installations in cold storage work, freezing processes, cold-aging, food distribution, industrial refrigeration and air conditioning.

FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

STORAGE

Dried Food Spoilage

SPOILAGE of dehydrated foods results from the growth of various microorganisms, some of which require only a small amount of available moisture to multiply rapidly. Bacteria do not grow below 18 percent moisture; yeasts require 20 percent or more; but molds may multiply at 13 percent moisture, and grow rapidly at 16 percent and above. Hence, the moisture affinity of the dehydrated product, temperature of storage, and presence of inhibitory substances all have an effect on the keeping qualities. Protection against contamination involves: (1) Preventing access of microorganisms to a dehydrated product that has already been sterilized, which can be accomplished by sterilizing with ultraviolet light and packing in sealed Cellophane or Pliofilm; (2) keeping the packaged product in dry atmospheres where the relative humidity is not more than 70 percent at temperatures ranging from 50 to 80 deg. F.—lower temperatures may lead to condensation of atmospheric moisture, while higher ones will be favorable to the growth of "dryness-resisting" organisms; (3) limiting mold growth by toxic substances.

Digest from "Dehydrated Foods and Micro-Organisms," by B. Heath, *Australian Food Manufacture*, vol. 16, no. 12, July 5, 1947.

DAIRY

Cheddar Cheese Yields

BUTTERFAT retention is greater in Cheddar cheese made from pasteurized milk than in that made from raw milk, according to experiments carried out at the Ontario Agricultural College.

Results of nine comparative trials are reported. In each trial 1,800 lb. of carefully mixed milk was divided into three lots. The first lot was made into raw milk cheese; the second was pasteurized at 143 deg. F. for 30 min., then made into cheese; the third lot was pasteurized at 161 deg. F. for 16 sec. before manufacture. Yields of 1-day-cheese, calculated in terms of 35 percent moisture, were: 9.84 lb. per 100 lb. raw milk; 10.02 lb. per 100 lb. of batch pasteurized milk; 10.01 lb. per 100 lb. of H.T.S.T. pasteurized milk. Butterfat retention was: 88.68 percent in the case of raw milk cheese; 90.15 percent for batch pasteurized milk, and 91.13 percent for H.T.S.T. pasteurized milk.

Digest from "A Comparison of the Yields of Cheddar Cheese Obtained from Raw, Holder Pasteurized and High Short-Time Pasteurized Milk," by O. R. Irvine, L. R. Bryant, D. C. Hill and W. H. Sproule, *Journal of Dairy Science*, vol. 30, no. 8, 530-31, August 1947.

VITAMINS

Vitamin Retention of Blanched Vegetables

GREEN beans, lima beans, peas and spinach have been investigated with respect to vitamin retention after blanching with steam and water at different temperatures for varying periods of time.

Ascorbic acid content of all four vegetables was adversely affected by both methods of blanching, irrespective of time and temperature, with the effect of steam blanching less marked than that of water. Under the most severe blanching operations, peas, green beans and lima beans retained about 40 percent of their original ascorbic acid content, and spinach about 20 percent. Under the most favorable conditions, retention ranged from 72 to 93 percent, depending on the product.

Riboflavin retention under water blanching of peas, spinach, and lima beans was more markedly affected by increased time of blanch than by increased temperature. Under severe conditions these vegetables retained only 50, 57 and 27 percent, respectively. Under more favorable conditions, retention ranged from 90 to 100 percent, varying with the product. Green beans showed good retention of riboflavin after water blanching, but all four vegetables lost significant amounts from steam blanching.

Under most adverse conditions of water blanching, peas, lima beans, and spinach retained 66, 55 and 33 percent, respectively, of original thiamine content, whereas under most favorable conditions the range was 82 to 97 percent. Relatively small losses resulted from steam blanching of the three vegetables.

Carotene retention by peas and spinach was unusually good under various conditions of blanching. Appreciable losses of niacin were sustained by lima beans under all conditions of blanching, with increasing time showing a more adverse effect than increasing temperature.

Digest from "Effect of Duration and Temperature of Blanch on Vitamin Retention by Certain Vegetables," by N. B. Guerrant, M. G. Vavich, O. B. Fardig, H. A. Ellenberger, R. M. Stern and N. H. Coonen, *Industrial and Engineering Chemistry*, vol. 39, no. 8, 1000-1007, August, 1947.

Ascorbic Acid in Australian Fruits

WARTIME determinations of ascorbic acid were made in connection with food supply to the armed services, and are now published in considerable detail as being of general interest in the field of nutrition. Thousands of samples were analyzed in every state in the Commonwealth and in Tasmania. The tabulated results must be consulted

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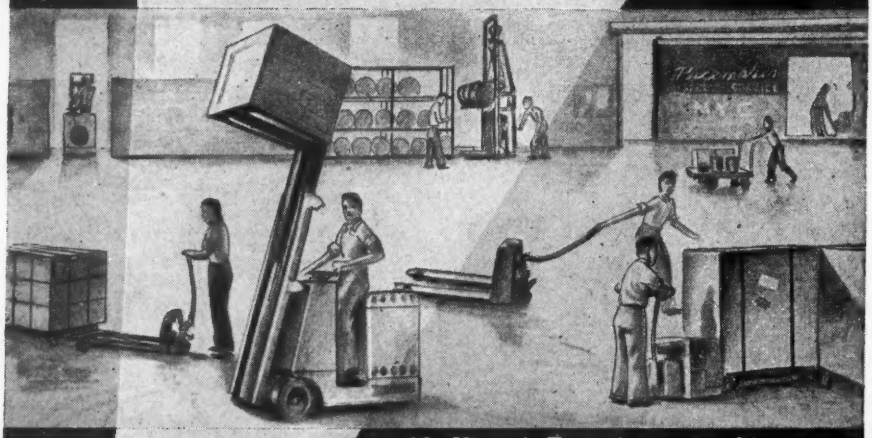

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in the original publication. Fresh, canned and dried fruits and vegetables were tested. In a variety test of fresh apples in Tasmania, the Sturmer was found to contain about twice the ascorbic acid content of nine other varieties. Canned orange juice showed a definite monthly variation, and pineapple juice showed an appreciable difference between summer and winter crops. Carotene also was determined in some fruit and vegetable products.

Digest from "The Ascorbic Acid and Carotene Content of Some Australian Fruits and Vegetables," *Journal of the Council for Scientific and Industrial Research*, vol. 20, No. 1, February, 1947.

CEREAL PRODUCTS

Breakfast Cereal

SHREDDED ready-to-eat cereal composition containing de-fatted soya bean particles to enhance protein content is the subject of a patented process. Other cereals in the composition may be corn, rye, wheat, rice, or oats. The latter are steam-cooked under pressure and flavored, after which flavored soya particles are added and the mass cooked further. After tempering, the mass is shredded, dried and toasted in an oven. A composite of 25 percent soya and 75 percent cereal gives a tasty product with a protein content of 16 to 18 percent.

Digest from U. S. Patent 2,421,216, issued May 27, 1947, on an application dated June 11, 1943, to William P. Penty, Battle Creek, Mich., and assigned to Kellogg Company, Battle Creek, Mich.

BAKING

Staling of Bread

DURING the staling of bread the starch substance becomes less soluble by change from a sol state to a crystalline aggregate. Simple starch systems also undergo reactions that resemble staling of bread. But there has been a difference of opinion as to which starch fraction is responsible for the observed changes: the A-fraction (amylose, a linear chain molecule) or the B-fraction (amylopectin, a branched or tree-like molecule). The present investigation was undertaken to re-examine some of the concepts on bread staling.

First experimental procedure was to extract soluble starch from bread crumb during the staling process, and determine changes that occur therein, using iodine affinity to es-

(*Continued on page* 180)

bouillon-flavoring problem?

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tablish the composition of the soluble extract. Extractions were made at 86 deg. F. and 122 deg. F., the latter intended to simulate results that would be obtained on bread refreshened by heating to 122 deg. F. Iodine affinity was also determined for defatted wheat starch and for pure wheat A-fraction. Aging studies were made on defatted wheat starch pastes under conditions simulating the baking and cooling of a loaf of bread. Finally, experiments were made on the effect of various bread ingredients on the staling of 50 percent wheat starch pastes.

The authors conclude that the water-soluble starch leached from fresh bread crumb at 86 deg. F. is predominantly the branched B-fraction, and that the progressive decline in solubles during aging indicates that the cause of staling may be a spontaneous aggregation of the branched B-fraction. Parallel behavior was observed during the aging of simple 50 percent aqueous pastes of defatted wheat starch. This substantiated the theory that staling is inherent in the B-fraction and is not due to interaction between starch and other bread ingredients. Finally, pure B-fraction shows aggregation effects that may typify its behavior in bread staling.

Digest from "Studies on Bread Staling. I. The Role of Starch," by T. J. Schoch and D. French, *Cereal Chemistry*, vol. 24, 231-249, July, 1947.

FATS and OILS

Cottonseed Pigments

SOLVENT extraction of cottonseed presents problems in avoiding or removing color in the extracted oil, and in destruction or removal of pigments of the meal.

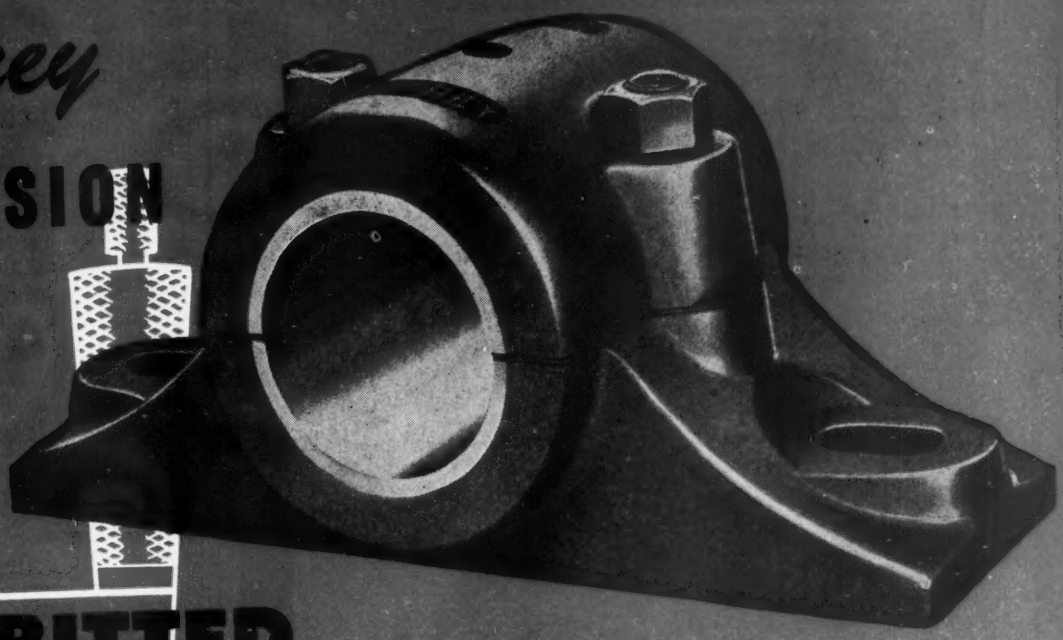
One group of complex pigments —gossypol and related products— are segregated in strong, thick-walled glands in the kernel. They are responsible for most of the dark color in solvent extracted oil and meal. The glands usually remain in the meal unless their walls are ruptured either by grinding or by contact with water or certain water-miscible solvents. If not ruptured they can be removed from the flaked seed by a flotation process.

Another group of pigments comprises the carotenoid and a second yellow, oil-soluble pigment. These occur in the oil in the extraglandular tissue of the seed and will be contained in all solvent extracted oils.

Pigments of the hulls are unaffected during extraction of oil by

Jeffrey

PRECISION BUILT



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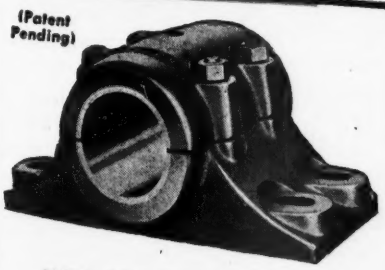
(Patent Pending)



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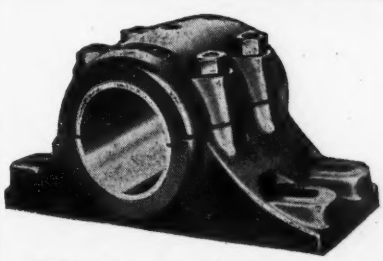

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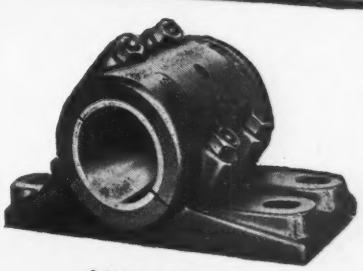

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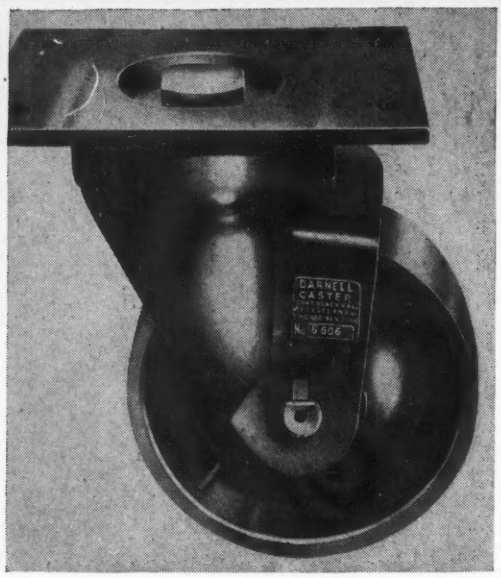

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the usual organic solvents, and they remain in the hulls which are mixed with the meal.

Based on the properties of the pigments and pigment glands of cottonseed, it is possible to control pigmentation of the meal and oil. For the recovery of oil free from glandular pigments, water must be excluded from the system and other than water-miscible solvents used. The resulting meal will contain most of the pigments of the seed. Alternatively, all of the pigments of the seed may be extracted by using water-miscible solvents which rupture the glands, and removing the pigments by customary refining methods. Finally, a gland flotation process can be used to remove intact pigment glands, yielding both oil and meal substantially free from pigments in a single operation. The choice of methods for removing residual pigments from solvent extracted meal will be determined by the amount and distribution of pigments.

Digest from "Processing of Cottonseed. II. Factors Determining the Distribution and Properties of Pigments in Products Prepared by Solvent Extraction," by C. H. Boatner, C. M. Hall, R. T. O'Connor, L. E. Castillon and M. C. Curet, *Journal of the American Oil Chemists' Society*, vol. 24, no. 8, August, 1947.

FRUITS

Improved Fruit Juice

FRUIT juice, having the characteristic color of the fruit from which it is derived, but without being cooked or treated with dyes, is produced by a recently patented process. Crux of the process is uniform refrigeration of the fresh juice to a mass containing fine crystals of ice; subsequent addition of heat to a point below the freezing point of water; separation of the resulting liquid from the ice mass which retains solid pulp particles; melting the ice mass and separating the pulp particles; running the latter through a colloid mill or homogenizer, and adding the colored product to the juice separated from the ice mass.

Digest from U. S. Patent 2,419,909, issued April 29, 1947, on an application dated June 29, 1944, to Harry A. Noyes, Watertown, Mass.

Off-Flavored Orange Juice

MUCH of the off-flavor that develops in processed orange juice, especially when stored in glass at room temperatures, comes from fatty material in the juice that is not removed in the processing, rather than from peel oil, according to ex-

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— and further, you'll find that it yields a salad dressing with a creamy, fine-grained texture . . . rich, deep color . . . and a tangy flavor that is free of the cereal taste found in ordinary corn starch. Finally, you'll find that it ages without losing its original smooth texture and gloss.

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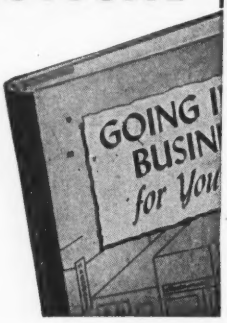

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By O. Fred. Rost, Editor, Electrical Wholesaling; Marketing Editor, Business Week; Director, Surveys of Distribution. McGraw-Hill Publishing Company, 344 *pages,* 5½x8, 19 *illustrations*..$3.00

A practical, readable manual to help the reader start his own business with the best possibilities for success, no matter how little his experience. Covers all the major aspects of what it means to start your own business, what tangible and intangible assets are required and gives many pointers on choosing the right type of business, legal and financial problems, and methods of locating, organizing and operating the business. Gives important information applicable to starting *any* kind of retail store or small service shop; discusses essential guides and the opportunities for success in over 20 specific small businesses.

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periments reported from the Department of Agriculture's Citrus Products Station at Winter Haven, Fla.

None of the 18 experimental packs of orange juice in glass showed a serious change in flavor when stored at 40 deg. F. for one year. Samples stored at 80 deg., however, were darker than those at 40 deg. after only three months, and a flavor change was noticed in every case. Samples with peel oil content high enough to mask off-flavor tasted best after long storage. Filtering out the suspended matter largely prevents development of off-flavor during storage at room temperature.

Digest from "Off-Flavor in Orange Juice," USDA Clip Sheet, August 10, 1947. Complete report obtainable from Agricultural Chemistry Research Div., Bureau of Agricultural and Industrial Chemistry, 2100 Robert E. Lee Blvd., New Orleans 19, La.

DEHYDRATION

Dehydrofreezing

Dehydration before freezing food products for the purpose of preserving them and improving their quality is the feature of a recent patent. The combination obviates the disadvantage of the cold-pack process which yields an excessive quantity of liquid when the frozen product is thawed. If the food is first partly dehydrated and then frozen by immersion in a low-temperature solution, it will absorb the refrigerant and will not give up any substantial part of its own moisture, flavor or color. The process makes possible a new field of food product blending by causing partly dehydrated foods to absorb from the refrigerant a solution containing coloring matter, flavoring ingredients, vitamins, minerals, or anti-oxidants.

Digest from U. S. Patent 2,419,877, issued April 29, 1947, on an application dated October 16, 1943, to Clarence Birdseye, Gloucester, Mass., and assigned to Dehydration, Inc., Gloucester, Mass.

Dehydration Apparatus

Appropriate for carrying out the dehydration step outlined in the preceding paragraph, and for general drying purposes, is a patented apparatus consisting of a casing enclosing a series of superimposed conveyor belts traveling in opposite directions. The top belt receives the food to be dried and discharges its load onto the belt below, and so on to the point of discharge. Each belt travels over a heating unit and under radiant lamps. Hot arid gas

CASE HISTORY NO. 20

One in a series of factual experiences telling how and why various American manufacturers use St. Regis Packaging System.

COST COMPARISON (per ton)

	100-lb. cloth bags	50-lb. paper bags
Container cost per ton	$6.00	$3.20
Labor cost per ton	.66	.40
Total bag and labor cost per ton	$6.66	$3.60
Saving per ton, paper over cloth		$3.06

CLASS OF PRODUCT PACKED

CEMENT	FERTILIZER
CHEMICALS	FOOD
FEEDSTUFFS	MINERALS √

PRODUCT CHARACTERISTICS

ABRASIVE	GRANULAR √
CORROSIVE	HEAVY √
DELIQUESCENT	HYGROSCOPIC
FLUFFY	LIGHT
FREE-FLOWING √	VISCOUS

St. Regis Packaging Systems **are designed to meet a wide range of product requirements and plant layouts. Packers are available in a variety of sizes and types, with filling speeds as high as twenty-four 100-lb. bags per minute — with one operator. Nearly 400 commodities—rock products, fertilizers, chemicals, foods, and feeds — are now being packaged in sturdy, low-cost multi-wall paper bags.**

To manufacturers who want to cut packaging costs

Multiwall Paper Bags Bring Saving of 44% at The United States Graphite Co.

Now their packaging output is limited only by the capacity of the mills to grind the material!

"It has been a remarkable change," say officials of The United States Graphite Company in Saginaw, Michigan.

In 1944 this company changed from 100-lb. cloth bags to a St. Regis Packaging System to pack various grades of graphite in 50-lb. multiwall paper valve bags. The company is now using a total of seven St. Regis valve bag filling machines.

One of the main factors that brought about the change to multiwall paper bags was the promise of high hourly production. Under the old inefficient system, packaging output per hour was low . . . labor costs high. Not only that, but container costs were high. Cloth bags cost $6.00 per ton of material packed . . . Multiwalls only $3.28.

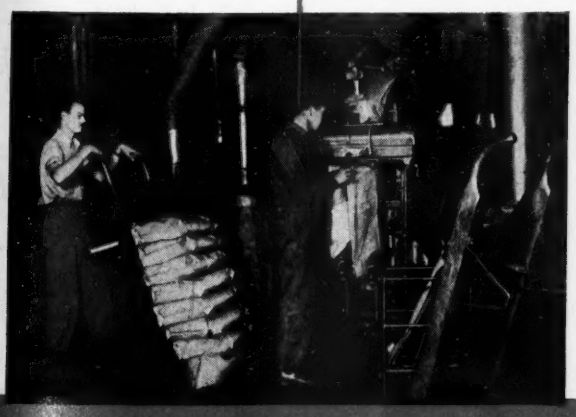
According to company officials, the results achieved by the St. Regis System are:

- A 66% increase in packaged output, using the same number of men.
- Per-ton packaging costs dropped 44%.
- Container costs reduced 44%.
- Labor costs reduced 39%.
- Preference by workers and customers for the easily-handled 50-lb. multiwall paper bag.
- Cleaner, neater, protective packages.

"It's an exceedingly satisfactory operation," say company officials, "and one that other industries may well duplicate."

Is *yours* such an industry? Mail the coupon for an illustrated folder with more details of this Case History. Learn how a St. Regis Packaging System can improve your packaging operation.

The high-speed 152-PB valve bag filling machine cuts labor costs and provides a cleaner packaging operation. Multiwall paper bags are clean and easy to handle . . . they protect the product during shipment.



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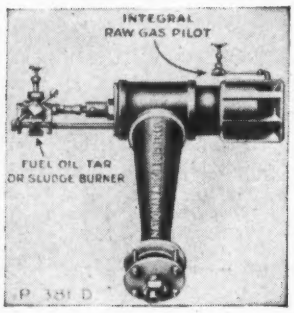

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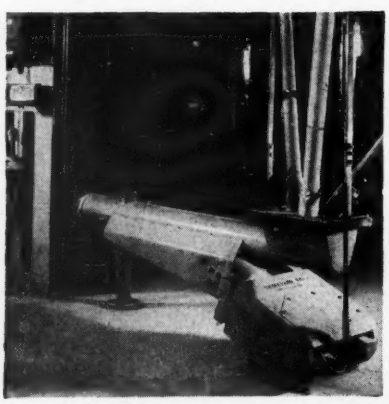

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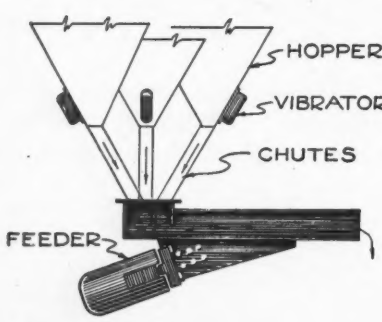

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The illustration above, and diagram at left, show how one company is feeding three materials at once to a bucket elevator which in turn takes them to a mixer.

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SYNTRON CO.
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is introduced into the next lowermost compartment, traveling in the direction of the belt conveyor, and issues at the top. Under these conditions moisture is driven from the interior to the exterior of the food particles, and a dehydrating gas at 350 deg. F. may be used without overheating or case-hardening the product. A wetting agent applied to the dried product before pressing into cakes aids in the process of rehydration.

Digest from U. S. Patent 2,419,876, issued April 29, 1947, on an application dated September 1, 1942, to Clarence Birdseye, Gloucester, Mass., and assigned to Dehydration, Inc., Gloucester, Mass.

SUGARS

Purifying Sugar

IMPROVEMENT over the customary defecation of sugar solutions with lime is claimed in a patented process that substitutes a two-stage treatment. In the first stage the inventor uses magnesium oxide containing about two percent of hydroxide, raising the pH of the solution to about 10. After decantation and filtration the solution is treated with a 10 percent solution of phosphoric acid. The precipitate is filtered, and the end product is a clear solution without undesirable odor.

Digest from U. S. Patent 2,422,699, issued June 24, 1947, on an application dated July 3, 1944, to John J. Naugle, New York, N. Y., and assigned two-fifths each to Andres Bay Trading Corp. and Cuban Dominican Sales Corp., both of New York, N. Y.

QUALITY CONTROL

Solubility of Dry Milk

GREATER accuracy in determining the solubility of milk powders is offered in a "gravimetric sediment method," considered to be an improvement over the method now commonly used. A 5-g. sample of powder is treated in an Erlenmeyer flask with 35 ml. distilled water at 72 deg. F. The flask is stoppered and shaken for 30 sec., and the reconstituted milk is poured into a weighed tube which is centrifuged for 15 min. in a Babcock machine. Thirty ml. of the supernatant fluid is decanted and the top film carefully retained. Rinse the flask with 40 ml. of water at 72 deg. F., add to the tube containing the residue and again centrifuge for 15 min. Decant this wash water, retaining the film, dry the tube at 203 deg. F., and weigh. The weight of dry sediment is calculated as percent insoluble

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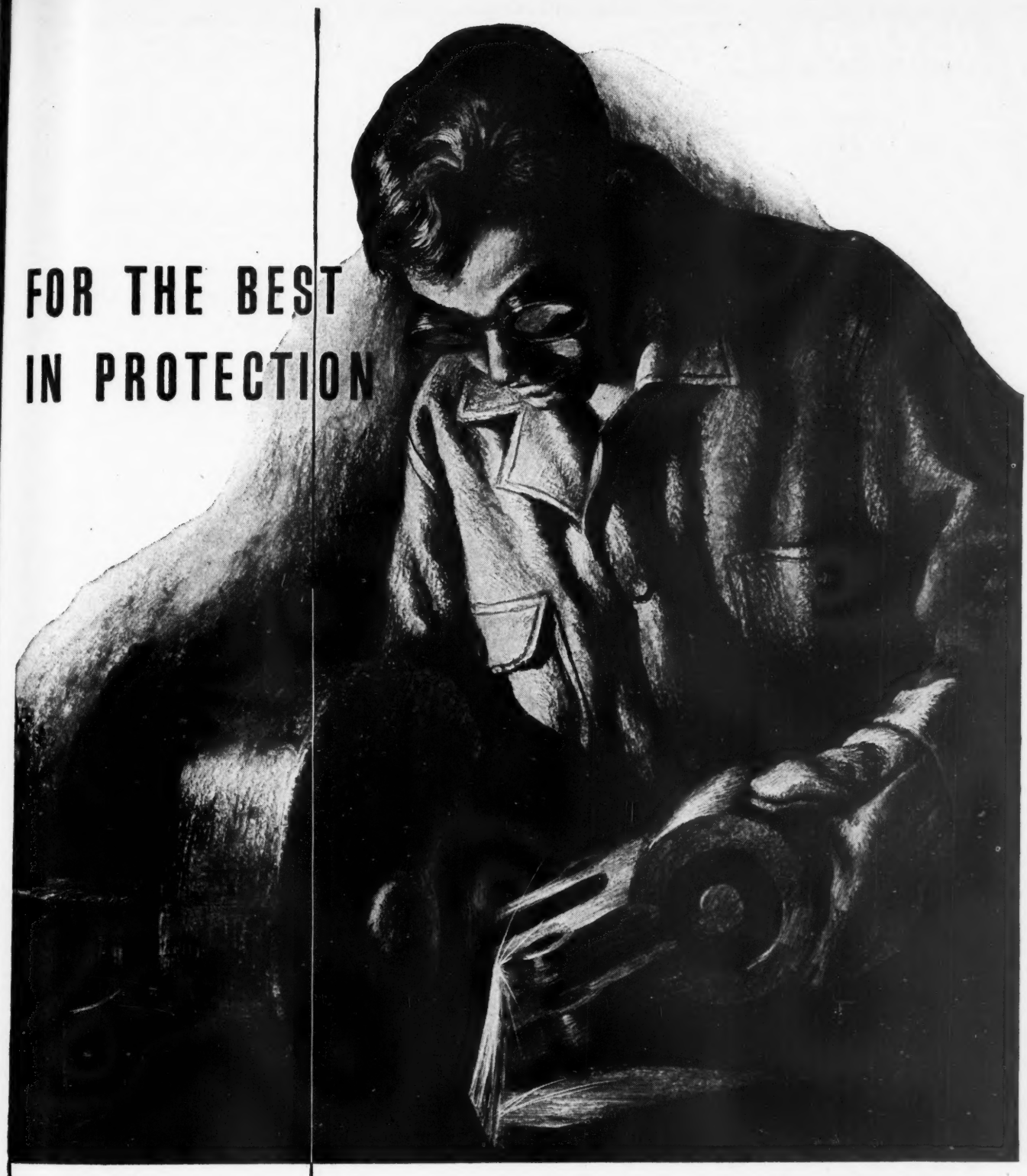

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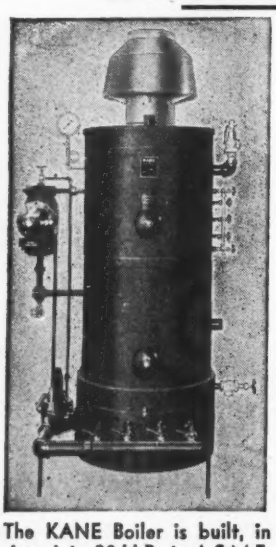
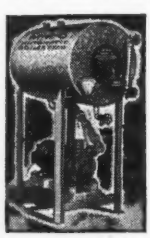


. . . the Automatic Gas-fired KANE BOILER

Compact, self-contained, and "tailor-made" for your job . . . includes: the study and solution of your problem; the correctly sized and constructed KANE Automatic, Gas-Fired Boiler; the M-K-O Automatic Boiler-Feed to provide a constant water level for highest boiler efficiency.

The KANE Boiler is built, in sizes 1 to 30 H.P., to A.S.M.E. specifications for operating pressures up to 100 lbs. Special boilers for higher pressures built to order.



The M-K-O Automatic Boiler Feed returns condensate and supplies small quantities of hot water as needed to the KANE Boiler.

MEARS-KANE-OFELDT INC.

1903-1915 EAST HAGERT STREET, PHILADELPHIA 25, PA.

FOUR DECADES OF AUTOMATIC GAS-FIRED BOILER MANUFACTURING EXPERIENCE.

matter which, subtracted from 100, gives solubility index in terms of percent. Experimental results are compared with other methods.

Digest from "A New Quantitative Method for Determining the Solubility of Milk Powders," by J. Frank Cone and U. S. Ashworth, *Journal of Dairy Science*, vol. 30, no. 7, 463-472, July, 1947.

MISCELLANEOUS

Molybdenum Improves Growth of Legumes

MOLYBDENUM in minute quantities has been shown to be beneficial in the growth of herbage legumes on pasture lands in Australia. Other metals, such as manganese, copper, boron, iron and zinc, proved ineffective. Use of molybdenum was suggested by the fact that wood ashes, found by spectroscopy to contain that element, produced marked improvement in soils that otherwise raised scanty crops of clover and grass. Also molybdenum had earlier been known to stimulate nitrogen fixation by *Azotobacter*. Pasture improvement was due principally to its effect on clovers. Grasses did not respond. Best results were obtained from application of 1 oz. molybdenum trioxide per acre. Sodium and ammonium molybdates also were effective, but the mineral molybdenite (sulphide) was not, unless previously roasted. The use of superphosphate is apparently necessary to obtain the beneficial effects of molybdenum, one application of which will suffice for several seasons. Necessary frequency of application has not been established.

Digest from "Molybdenum in Relation to Pasture Improvement in South Australia," by A. J. Anderson, *Journal of the Council for Scientific and Industrial Research*, vol. 19, No. 1, February, 1946.

Control of Wheat Pests

FINELY ground magnesite and dolomite were used experimentally in Australia during the war to control insect infestation of bulk-stored wheat. The dusts were applied to the surface of the grain at the rate of one, three, six, and eight tons per million bushels, equivalent, respectively, to 0.19, 0.58, 1.15, and 1.54 percent by weight of 6-in. depth of wheat. The highest three dosages of magnesite markedly reduced the infestation rate, but dolomite was less effective. Cost, at five tons of dust per million bushels, was 0.03 pence per bushel.

Digest from "The Use of Mineral Dusts for Control of Wheat Pests," by Frank Wilson, *Council for Scientific and Industrial Research*, Melbourne, Australia, bulletin No. 199.

Theobromine from Cocoa

SUBLIMATION is the first step in the recovery of theobromine from cocoa products, according to a patented process. The condensate consists of a watery fraction and a tarry fraction. The former contains most of the theobromine, and is separated from the latter in any suitable manner. The tarry fraction is treated with a solvent to permit recovery of the trapped theobromine by filtration. Crude theobromine thus recovered can be purified by crystallization from a hot water solution treated with activated carbon. Other useful products obtained in the process are carbon from the charred cocoa material, and organic substances which have the properties of photographic developers.

Digest from U. S. Patent 2,422,874, issued June 24, 1947, on an application dated August 12, 1944, to Benjamin J. Zenlea, Ozone Park, N. Y., and assigned to Rockwood & Co., Brooklyn, N. Y.

Preserving Potatoes

TREATMENT with sulphur dioxide is the feature of a patented process for preventing discoloration in peeled white potatoes. After peeling, the potatoes are first immersed in cold water and then in a refrigerated one percent solution of sulphur dioxide for 5 to 30 seconds. They are then packed in water-resisting paper or cloth containers to minimize access of air and stored in refrigerators until needed.

Digest from U. S. Patent 2,420,322, issued May 13, 1947, on an application dated December 1, 1943, to Ralph F. Matarazzo, Medford, Mass.

Toxic Residues of DDT

DEVELOPMENT of equipment and procedure form a large part of a progress report on the toxicity to houseflies of DDT residues on various surfaces and materials. Spraying apparatus was designed that gave even replications of deposit from kerosene-xylene solutions containing 12, 8, and 4 percent DDT by weight. Test cages were developed into which a selected group of flies could be introduced to test the toxicity of sprayed surfaces fitted within the cages. Each set of surfaces was tested once a month for a period of 10 min., five cages making one set of replicates for each strength of DDT solution. Of 9 materials tested, two smooth, non-absorptive surfaces, glass and Masonite, have recorded long-sustained and high mortalities. Two comparatively absorptive surfaces, "ten-test" (insulating wall board) and planed unpainted pine, showed toxic residues after 20 months ex-

The KEY TO PLANT SANITATION is this

Continuous Insect Control

INSECT control to be truly effective must be a *continuous process* . . . it must destroy all stages of insect life: eggs, larvae, pupae and adults. This is an important advantage of the "ENTOLETER" Insect Control System. It is *continuous* mechanical control that, once installed, becomes an integral part of your processing. The result of "ENTOLETER" Insect Control is a complete and continuous kill that gives protection to raw materials, to materials before and after storage, and to your finished products before packaging. By constantly destroying all stages of insect life, the threat of insect multiplication is eliminated, and food materials are protected from adulteration by insect excreta.

It is obvious from this description of its applications, that the "ENTOLETER" Infestation Destroyer is a primary part of the modern plant sanitation system . . . the key to effective control. By continuous "ENTOLETER" operation, the food processor destroys insect life before it can build up and threaten plant or product cleanliness. The basic purpose of "ENTOLETER" Continuous Control is to prevent infestation from developing. In addition to this service, the "ENTOLETER" system is an excellent means of blending flours, mixing compounds and improving vitamin distribution.

Write for new Bulletin describing "ENTOLETER" control and latest Plant Sanitation Methods. ENTOLETER DIVISION, The Safety Car Heating & Lighting Co., Inc., P.O. Box 904, New Haven 4, Conn.

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CONTINUOUS INSECT CONTROL SYSTEM

The C-B Catsup Cavalcade

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Better Color
Better Texture
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Less Fuel

Control of catsup quality starts at the kettles. Uniformly HOT kettles brought to a boil with speed, preserve the natural tomato color, accelerate cooking, increase production and save time and fuel. The results attained by many well-known catsup-makers are duplicated in dozens of industries using steam for process work — undoubtedly in yours. Write for a copy of Publication 3250 and see for yourself.

This is the Jet Loop Pump, the heart of the Cochrane C-B System, comprising a Jet Pump, a Priming Loop Strainer and Air Separator.

COCHRANE CORPORATION 3106 N. 17th St. Phila. 32, Pa.

COCHRANE C-B CONDENSATE BOOSTER SYSTEM

OF HIGH PRESSURE, HIGH TEMPERATURE CONDENSATE RETURN

posure. Wall paper exposed for 15 months continued to give satisfactory kills. Four surfaces (plain cement, fresh painted wood, fresh white-washed cement, and one-month-old whitewashed cement) broke down after 7 or 8 months. These preliminary results will be supplemented by later reports as the experiment proceeds.

Digest from "DDT Residues: Their Toxicity to Houseflies on Various Surfaces and Materials," by H. A. U. Monro, A. A. Beaulieu, and R. Delisle, *Soap and Sanitary Chemicals*, vol. 23, no. 8, August, 1947.

$CaCO_3$ from Egg Shells

CALCIUM carbonate, that is sterile and free from impurities derived from ordinary mineral sources, can be produced from egg shells, according to a patented process. Shells are washed with hot water to remove albumen, drained, dried with hot air and ground in a micropulverizer. A wide variety of uses is claimed for the product.

Digest from U. S. Patent 2,419,822, issued April 29, 1947, on an application dated March 29, 1944, to Mario Contesso Astoria, Long Island, N. Y.

Concrete Flooring Improved with Asphalt

ADDITION of about three percent of asphalt emulsion to standard flooring mixtures greatly increased the shock-absorbing qualities of the finished concrete without noticeably decreasing its strength or durability, according to a 28 page report by the Office of Technical Services, Department of Commerce.

Bitumin alone did not produce satisfactory results. When experiments with cement-bitumin mixes were undertaken, however, excellent results were obtained. Resiliency, as measured by the bounce of a ball bearing dropped from a height of 3 ft., was much greater than in any other floor tested. Typical results were: concrete 6 to 8 in.; wood flooring 4 to 6 in.; asphalt tile on concrete 5 to 6 in.; and concrete-bitumin mixtures 2 inches.

Costs are likely to be lower since the new type flooring can be finished by power float. Preliminary tests show that the new mixture has adequate strength properties, including compression, abrasion and indentation resistance. It has a somewhat lower heat conductivity than standard concrete floor. Tables showing the results of various mixes as well as a chart of compressive strengths of test samples are included.

Digest from "Final Report on Stabilized Aggregate Floor," PB-31893. Office of Technical Services, Department of Commerce, Washington, D. C.

BOOKS

Water and Disposal

WATER SUPPLY AND SEWERAGE, Second Edition. By Ernest W. Steel. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y., 1947. 666 pages; 6½x9¼ in.; cloth. Price, $6.

Water supply and sewerage frequently develop knotty problems in the food processing plant. This edition, like the first published in 1938, attempts to outline the principles and everyday practice involved in solving them.

While the book is designed primarily for students in sanitary engineering, it is practical enough to be of value to food plant engineers, and other technical personnel, who are confronted with either of these plant functions.

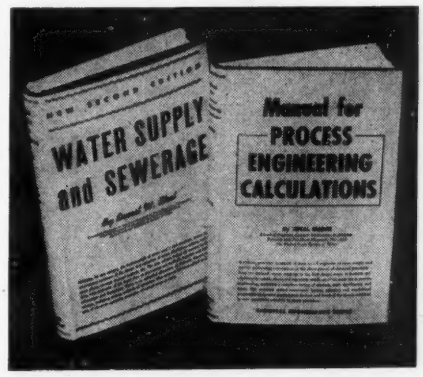
This second edition enlarges the discussion of chlorine and its uses and describes break-point chlorination. U. S. Public Health Service standards for drinking water are also included, as are threshold odor test of water, and recent innovations in water softening and water correction. More attention has also been given to sewage pumping and sewer maintenance and to high rate trickling filters. Other changes and revisions from the first edition are also apparent.

Fats and Oils

THE GERMAN OILSEED INDUSTRY. By W. H. Goss. Published by Hobart Publishing Company, Washington 15, D. C., 1947. 288 pages; 8¼x11 in.; paper. Price $17.50.

Of interest to everyone concerned with fats and oils, both edible and inedible, is the collection of reports on the German oilseed industry written by a chemical engineer. All reports have been edited or rewritten since they were originally issued by the Office of Technical Services, U. S. Department of Commerce. In addition to the 51 photographs which are included, there are 35 drawings and three charts (one of them new).

Most of the leading oilseed mills and vegetable oil refineries in Germany are described in the chapters of this book. With few exceptions, the reproduction of the photographs is quite clear. As a reference volume this book will be essential on the library shelves of every organization interested in fats and oils.



Short Cut Calculations

MANUAL FOR PROCESS ENGINEERING CALCULATIONS. By Loyal Clarke. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y., 1947. 438 pages; 6¼x9¼ in.; cloth. Price, $6.

Process engineers, who are frequently confronted with the job of selecting equipment, should find this book a convenient reference. It provides at least a start on the compilation of a handy set of working data for rapid process calculations.

Along with numerical and mathematical data, conversion tables and physical and chemical properties of materials used, the book offers data on thermodynamics, piping, hydraulics and flow measurements, heat transfer, combustion, power, pumps, fans, blowers and compressors and absorption stripping and distillation.

Wage Study

THE GUARANTEE OF ANNUAL WAGES. By A. D. H. Kaplan. Published by The Brookings Institution, Washington, D. C., 1947. 269 pages; 5½x8½ in.; cloth. Price, $3.50.

Here are the results of an official study on annual wages, projected by the Brookings Institution more than two years ago. While pressure for adoption of this attempt at security has lessened considerably since then, it is an issue that is bound to rise from time to time. For that reason consideration of the problems involved will be forced upon management in every industry.

In evaluating the overall effects of guaranteed annual wages upon our economy, the book considers those industrial units that now offer such guarantees. It finds that the results that follow from a single unit's guarantee would be far different when applied to an entire

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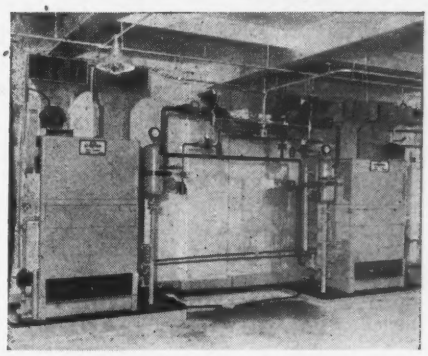

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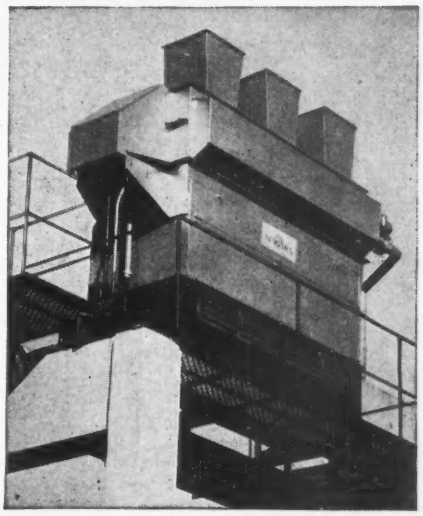
With Oilout, Duo-Pass and Balanced Wet Bulb Control



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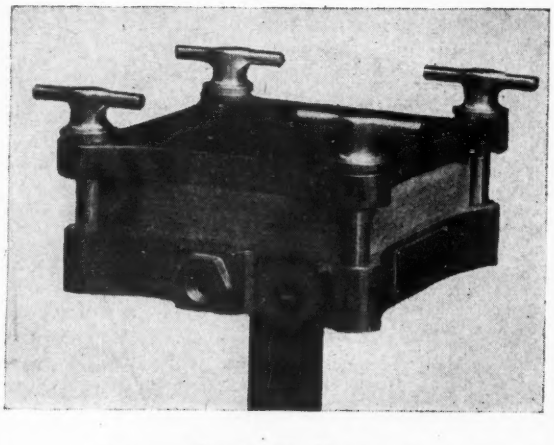

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industry. And when applied to all industries, the interplay of economic forces would impose restrictions upon individual enterprise that might be too high a price to pay for what would likely be a static security.

This is a book that should be studied carefully by both executive and worker for it contains a basic economic issue that will come to the fore as soon as employment figures begin to show a declining trend.

Seasoning Hints

HERBS, SPICES AND SEASONINGS. By Jean N. Lesparre. Published by Dahl Publishing Co., 74 West Park Place, Stamford, Conn., 1947. 92 pages; 4 x 6¼ in.; cloth. Price $1.

As directing chef in charge of Armour and Company's scientific testing research kitchen, the author has applied his culinary knowledge of spices, herbs and seasonings to industrial food manufacture and processing for enhancement of taste appeal, distinctiveness and variety.

In this convenient pocket-sized encyclopedia he has compiled a reasonably complete list of those of value in cookery and in food processing. Included are identification by name, source and distinguishing characteristics and suggestions for their use, both typical and unusual.

Colloid Primer

SMALL WONDER. By Gessner G. Hawley. Published by Alfred A. Knopf, 501 Madison Ave., New York, N. Y., 1947. 220 pages; 6x8¾ in.; cloth. Price, $3.50.

This is an interesting little volume, aimed at providing a more general understanding of colloids. It tells in non-technical language what colloids are and why they act as they do. It explains the nature and characteristics of many important foods, as well as such processes as homogenization of milk and the treatment and purification of water.

The food plant executive should find it helpful in gaining a better understanding of his technical operations.

Raw Materials

MATERIALS HANDBOOK; Sixth Edition. By George S. Brady. Published by McGraw-Hill Publishing Co., 330 W. 42nd St., New York 18, N. Y., 1947. 831 pages, 5½x8½ in.; cloth. Price $7.

Subtitled "An encyclopedia for purchasing agents, engineers, executives and foremen," this book

provides information on basic raw materials used in industry. While many food raw materials are included, the interests of the food plant operator would not be confined to them. The wide variety of materials, listed alphabetically, will help the plant builder as well as the designer and purchaser of machinery and other equipment.

The edition also provides, in a separate section, economic data on raw materials, conversion factors and other pertinent data on relative values.

GOVERNMENT PUBLICATIONS

The following recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated the pamphlet is free and should be ordered from the Bureau responsible for its issue.

FOOD AT THE GRASS ROOTS. The Nation's Stake in Soil Minerals. Tennessee Valley Authority. Unnumbered. Price 30 cents.

DIRECTORY OF REFRIGERATED WAREHOUSES IN THE UNITED STATES. U. S. Department of Agriculture, Production and Marketing Administration. June 1947. Unnumbered, mimeographed.

CANNED CITRUS FRUIT SEGMENTS AND JUICES; ANNUAL PACK AND DISPOSITION DATA 1928-29 TO 1945-46. U. S. Department of Agriculture, Production and Marketing Administration. Unnumbered, processed.

THE BALANCE SHEET OF AGRICULTURE, 1946. By A. S. Tostlebe, et al. U. S. Department of Agriculture, Miscellaneous Publication No. 620. Price 15 cents.

GRAPES AND GRAPE PRODUCTS. U. S. Tariff Commission, War Changes in Industry Series, Report No. 24. Price 20 cents.

DIRECTORY OF CONSUMERS' COOPERATIVES IN THE UNITED STATES. Bureau of Labor Statistics, Bulletin No. 750 (revised June 1947). Price 30 cents.

DIRECTORY OF LABOR UNIONS IN THE UNITED STATES. Bureau of Labor Statistics, Bulletin No. 901. Price 10 cents.

REPORTS OF THE THIRTY-SECOND NATIONAL CONFERENCE ON WEIGHTS AND MEASURES. National Bureau of Standards, Miscellaneous publication M186. Price 40 cents.

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PATENTS

Vegetable Cutter Made to Have Stationary Knives and Reciprocating Plunger—Joseph V. Myers, Tampa, Fla. No. 2,423,399. July 1, 1947.

Riboflavin Produced in High Yield by Growing *"Candida Flareri"* Aerobically—F. W. Tanner, Jr., and J. M. Van Lanen, Peoria, Ill., to United States of America. No. 2,424,003. July 15, 1947.

Nuts Sliced and Meats Separated from Shell by Mechanical Means—Fritz Albert Deutsch, Caracas, Venezuela. No. 2,424,022. July 15, 1947.

Milk Cans and Like Cleaned with Water Solution of Acid Cleaner Containing Non-Corrosive Organic Acid to Prevent Precipitation of Calcium and Magnesium Solids at Temperatures in Excess of 190 Deg. F.—Milton E. Parker, Barrington Township, Cook County, Ill., and Paul W. Bonewitz, Burlington, Iowa; one-half to Paul W. Bonewitz and one-half to Bonnie M. Bonewitz. No. 2,424,049. July 15, 1947.

Corn Starch Suspensions Heat-Treated, Aerated and Blended with Pine Oil and Boric Acid to Form Bacteriostatic, Non-Fading Stable Mixture for Laundry Use—J. S. Pecker and E. A. Pecker, Philadelphia, Pa.; one-half to Anne G. Pecker. No. 2,424,050. July 15, 1947.

Fish Filleted in Machine Equipped with Pair of Belly-Slicing Knives, Pair of Traction Disks Below Belly-Slicing Knives and Pair of Ribbing Knives—Charles M. Savrda, Bay Shore, N. Y., to Atlantic Coast Fisheries Co., New York, N. Y. No. 2,424,057. July 15, 1947.

Green Corn Cut from Cob at Measured Depth of Cut—C. E. Kerr, Hoopeston, Ill., to Food Machinery Corp., San Jose, Calif. No. 2,424,241. July 22, 1947.

Casings Stripped from Sausages Such as Frankfurters by Means of Fluid Blast Followed by Cutting with Knife—K. Wilcoxon to Visking Corp., Chicago, Ill. No. 2,424,346. July 22, 1947.

Peanuts Ground and Extracted to Recover Undenatured Globulins to Make Viscous Spinable Protein Solution—Sarah Neilson McGeoch, Greenford, England, to Imperial Chemical Industries, Ltd. No. 2,424,408. July 22, 1947.

Sea Salt Treated with Acid Phosphate to Eliminate Red Bacillus Contamination—H. Hempel, Essex, Mass., to Gorton-Pew Fisheries Co., Ltd., Gloucester, Mass. No. 2,424,615. July 29, 1947.

Cheddar-Type Cheese Cured Under Pressure in Air-Free State in Container Lined with Thin, Limp, Moisture-Proof and Oil-Resistant Material—Lewis H. Jones, Chicago, Ill., to Wingfoot Corp., Akron, Ohio. No. 2,424,693. July 29, 1947.

Vegetable Oils Freed from Hydrophilic and Waxy Components by Chilling to Below 60 Deg. F. for Formation of Cloudy Precipitant, Mixing Thoroughly with ½ to 5 Percent Water and Centrifuging to Separate Sludge—Fremont P. Parkin and George N. Walker to Minnesota Linseed Oil Paint Co., Minneapolis, Minn. No. 2,425,001. Aug. 5, 1947.

Whole Fruits and Vegetables Covered with Water Repellent Waxy or Oily Skin or Peel Treated to Impart Desired Color and to Control Shrinkage—Jagan N. Sharma, West Los Angeles, Calif. No. 2,425,073. Aug. 5, 1947.

Buckwheat Extracted with 35 to 85 Percent Ethyl Alcohol Solution for Recovery of Rutin—Edward L. Griffin, Jr., Philadelphia, Pa., to United States of America. No. 2,425,094. Aug. 5, 1947.

Partially Dried, Pitted Apricots Processed to Give Product Rich in Carotene—K. K. Newsom, San Francisco, Calif. No. 2,425,117. Aug. 5, 1947.

Yield of Synthesized Riboflavin Increased by Controlling Trace Iron in Media to About 1 ppm.—R. J. Hickey to Commercial Solvents Corp., Terre Haute, Ind. No. 2,425,280. Aug. 5, 1947.

Bread Dough Molded in Machine Equipped with Rollers cooled to Above Freezing Point of Water but Sufficiently Low to Condense Water from Surrounding Air—M. A. Sticelber, Kansas City, Mo., to Quik-Seal, Inc. No. 2,425,356. Aug. 12, 1947.

Chocolate Deposited in Molds to Make Final Product with Plurality of Superposed Layers—B. M. Le Vangie, Randolph, Mass., to General Foods Corp., New York. No. 2,425,431. Aug. 12, 1947.

Milk and Cream in Shipping Cans Cooled by Contact with Surface Cooled with Circulating Refrigerant Stored in Container Superimposed on Milk or Cream Cans—James Franklin Carter, Alice, Tex. No. 2,425,596. Aug. 12, 1947.

Frozen Foods Packaged in Sealable Knock-Down Box—Wm. Ringler, Wayne, Pa., to Gardner-Richardson Co., Middletown, Ohio. No. 2,425,642. Aug. 12, 1947.

Fruit and Vegetable Juices Subjected to Centrifugal Force in Closed System in Atmosphere of Inert Gas Preliminary to Screening—Henry G. Schwarz, Denver, Colo., to The Schwarz Engineering Co., Inc., San Francisco, Calif. No. 2,425,689. Aug. 12, 1947.

Solid Contaminants Separated from Fat During Convection Movement of Heated Fat in Deep-Fat Frying—Homer W. Kuehn and Fred G. Wheeler to Armour & Co., Chicago, Ill. No. 2,425,699. Aug. 12, 1947.

Fowls Mechanically Suspended and Extended for Eviscerating and Dressing Operations—L. Jasper, Orland, Calif., to S. S. Barker, Ottumwa, Iowa. No. 2,423,560. July 8, 1947.

(*Patents continued on page* 196)

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● Probably you'd look terrible. But one thing is sure—you'd stay *dry!* For asphalt keeps out moisture. And that's why we use asphalt to help keep Diamond Crystal Salt dry, and prevent caking.

Salt usually cakes in excessive humidity, because moisture condenses on salt particles, forming a thin layer of brine. Then, in dry weather, the brine evaporates and the crystals knit together.

Our research laboratory has found a number of ways to help prevent salt caking. Removal of moisture-attracting impurities, such as calcium chloride, helps. So does complete removal of fines by careful screening. Most important is to provide salt with a moisture- and vapor-resistant package.

Take our Flour Salt bag, for example. It is composed of three 50-lb. and two 25-lb. sheets of kraft, laminated together with 40 lbs. of asphalt per ream. That's a lot of asphalt, and it costs us more money—but our moisture-vapor transmission tests show this bag is worth the extra cost. The bag is even sewn with *waxed thread* to seal the holes made by the sewing-machine needle. That's real *protection*—one reason we have been able to eliminate caking as a major problem!

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If *you* have a salt problem, write our Director of Technical Service. He will be happy to help! Diamond Crystal Salt, Dept. **J-13,** St. Clair, Mich.

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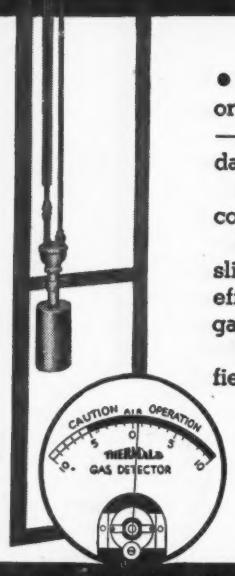

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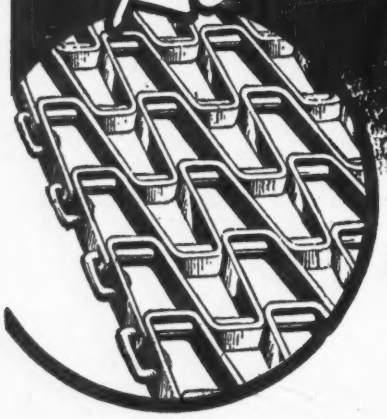

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PATENTS

(*Continued from page* 195)

Carbohydrate Mash Sterilized in Closed Pressure-Heating System During Flow Through Continuous Spiral—Edwin H. Carnarius, Wynnewood, Pa., to Publicker Industries, Inc. No. 2,423,580. July 8, 1947.

Texture of Ice Cream Improved by Use of Water Soluble Salt of Carboxymethylcellulose and Mixed Glycerol Di-ester of Higher Fatty Acid and Aromatic Carboxylic Acid—M. Landers to Lanco Products Corp., New York, N. Y. No. 2,423,600. July 8, 1947.

Ice Cream Texture Improved by Incorporation of Mixed Glycerol Di-ester of Higher Fatty Acid and Aromatic Carboxylic Acid in Mix Before Freezing—Bernard Nelson to Lanco Products Corp., New York, N. Y. No. 2,423,613. July 8, 1947.

Fruit Juices, Beverages, Extracts and Infusions Concentrated While Flowing at High Velocity Under Vacuum Over Heat Exchanger with Continued Separation into Concentrate and Vapor Portion with Recovery of Flavor Producing Volatiles in Condensate—George G. Zahm, Buffalo, N. Y., to Hurd Corp., New York, N. Y. No. 2,423,746. July 8, 1947.

Fruit Juices, Beverages, Extracts and Infusions Concentrated While Flowing Rapidly in Thin Film Under Vacuum Over Heat Exchange Surface with Continuous Separation into Concentrate and Vapor Portions and Recovery of Flavor Producing Volatiles from Condensate without Breaking Vacuum—George E. Zahm, Buffalo, N. Y., to Hurd Corp., New York, N. Y., N. Y. No. 2,423,747. July 8, 1947.

Gelatin Purified by Treating in Finely Divided Form with Solution of Acid to Form Salt with Cations of Impurities in Gelatin in Mixture of Water and Water-Miscible Organic Non-Solvent for Gelatin—J. A. H. Hart and E. W. Lee, Ilford, England, to Ilford, Ltd. No. 2,423,773. July 8, 1947.

Milk Fat Concentrated as Intermediate Step in Butter Making—H. C. Horneman, R. V. Hussong and S. N. Quam, Danville, Ill., and B. W. Hammer, Ames, Iowa, to Sugar Creek Creamery Co., Danville, Ill., and Cherry-Burrell Corp., Chicago, Ill. No. 2,423,834. July 15, 1947.

Sausage and Like Packaged in Thin, Foldable, Moisture-Absorbing Casing Innerlined with Moisture-Resisting Material—Elsa Vogt, Philadelphia, Pa. No. 2,423,861. July 15, 1947.

Vinegar Made by Process Providing for Turbulent Circulation of Air Substantially in Excess of Oxidation Requirements—J. J. Mackin to L. J. Kelly, Green Bay, Wis. No. 2,423,897. July 15, 1947.

Foods Quick-Frozen in —200 Deg. F. Black-Walled Chamber in Absence of Air and at Below Vapor Pressure of Water at Temperature of Cooling Walls—J. M. Baer, Chicago, Ill., to Guardite Corp. No. 2,425,714. Aug. 19, 1947.

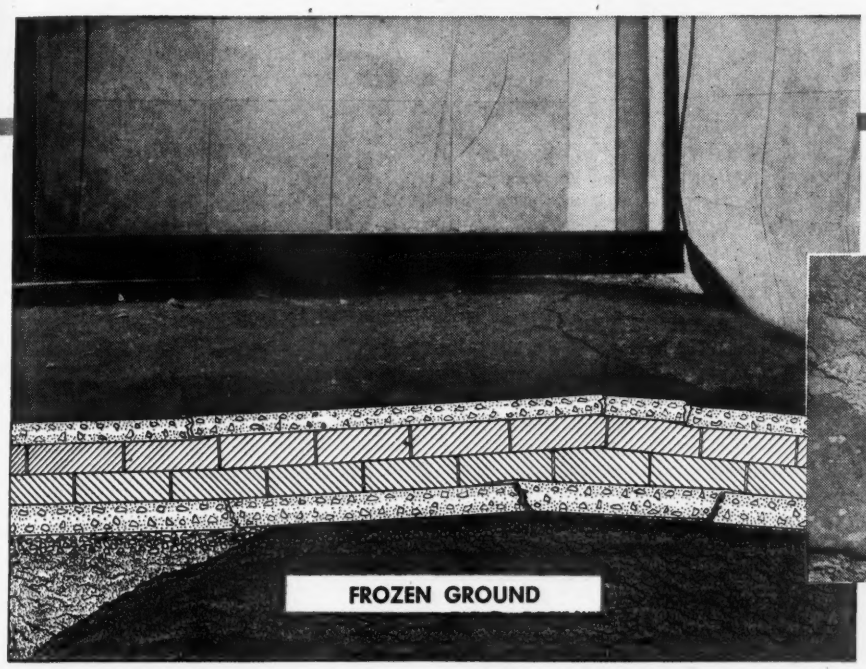
Hams Pressed in Low Production Capacity and Manually Operated Device—C. Butz, Muscatine, Iowa. No. 2,425,727. Aug. 19, 1947.

Foods Ground and Juices Expressed Under Vacuum—H. A. Appel, Bronx County, N. Y. and E. J. Le Blanc, Middlesex County, Mass. No. 2,425,912. Aug. 19, 1947.

Confectionery Ingredients Mixed in Vertical Cylindrical Container Which Rotates During Agitation of Contents and is Fitted With Bottom Discharge—J. J. Kooman to Confections, Inc., Chicago, Ill. No 2,425,942. Aug. 19, 1947.

Unrefined Sugar Crystals Freed From Molasses Content by Treatment With Steam During Passage Through Inclined Rotary Perforated Drum—G. E. Stevens, Denver, Colo., to Western States Machine Co., Hamilton, Ohio. No. 2,426,126. Aug. 19, 1947.

How to prevent frost damage to on-grade freezer floors



FROST IS POWERFUL. It can lift a floor and wreck a building. Under an on-grade floor, frost pressure builds up near the center of the room. It causes cracking and bulging of the floor and buckling of the walls.

THIS STOPS FROST DAMAGE. Drain tile laid under the subfloor permits outside air to warm the subsoil and stop frost formation.

WHEN a large freezer room is built directly on the ground, there's real danger that the soil beneath it will eventually freeze. As the frost builds up, it exerts sufficient force to heave up the cold room floor, bulge the walls, and overtax the capacity of the refrigerating system.

Frost formation occurs over years of operation. Ground heat is drawn out of the earth and through the floor faster than it can be replaced by outside heat flow into the ground at the edges of the building. The length of time required for formation of a damaging amount of frost will depend upon soil conditions, quality of insulation, and general construction. However, no practical amount of insulation can prevent flow of heat from the subsoil through the floor and consequent lowering of earth temperature. Insulation retards rather than prevents heat passage.

To forestall frost damage, Armstrong engineers have worked out economical methods of ventilating the soil under freezer rooms built on-grade. Air ducts, either of concrete or drain tile, are spaced at regular intervals in a cinder or crushed stone fill under the subfloor. These ducts introduce sufficient warm air to keep ground temperatures above the freezing point and prevent formation of frost.

Before you build any refrigerated space, it pays to talk your plans over with one of Armstrong's engineers. There's no obligation. Drawing on Armstrong's vast experience, the engineer can often make suggestions that will prevent needless dissatisfaction and expense. For complete details, write to Armstrong Cork Co., Building Materials Div., 4211 Concord St., Lancaster, Pa.

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Complete Contract Service For All Temperatures

From 300° Below Zero

To 2800° Fahrenheit

STE-VAC HEATERS

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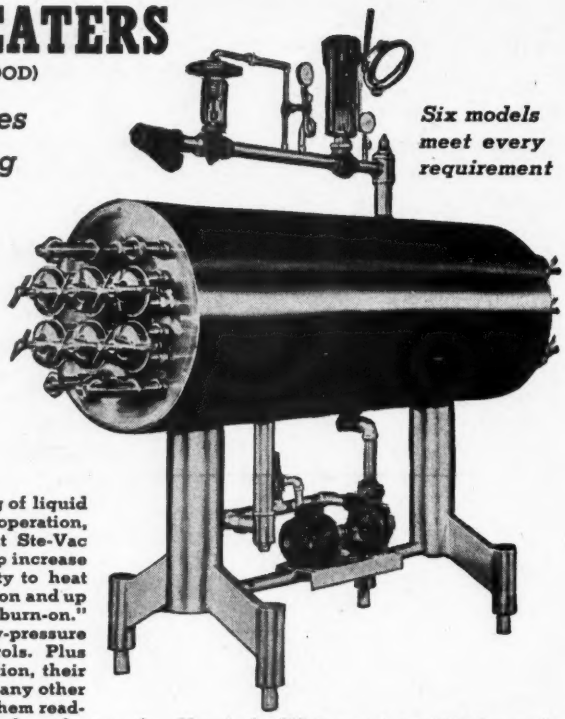
High Temperatures
Sustained Heating
No "burn-on"

- 5,000 to 40,000 lbs. per hour capacity
- Quickly adapted to practically any liquid food heating operation



Six models meet every requirement

If high temperature processing of liquid foods is part of your plant operation, you'll want to know all about Ste-Vac Heaters and how they can help increase production. About their ability to heat up to 190° in one stage operation and up to 240° in two stages—without "burn-on." Plus their utilization of dry, low-pressure steam under self-acting controls. Plus their stainless steel construction, their ease of installation and the many other Ste-Vac features which make them readily adaptable to your plant and product, and assure you of maximum heating efficiency.

There's a Ste-Vac Heater for your particular needs. Write for detailed information and specifications.

Here is the SV-8, containing 18 tubes each 6' long. This heater can handle 6,000 pounds of liquid food per hour in heating from 40° to 190°. Floor space 2' by 8'. Shipping weight 2,000 pounds.

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IT EMULSIFIES . . .
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CARRAGAR is an agar-type gelatin which forms tender, fruit-like gels over a wide pH range. It does not require acidulation to produce desired results.

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SEAPLANT PRODUCTS DIVISION
NEW BEDFORD, MASS.

Poultry Boning Plants

(*Continued from page* 106)

ples showed a slight reduction in total counts after they were held one month at –14 deg. F.

Chicken Fricassee

Chicken fricassee is prepared by adding pieces of raw chicken from freezer storage to a can containing stock made up of chicken fat, ground chicken skins and seasoning. The can is then processed at 245 deg. F. for 80 min. Raw chicken meat and unprocessed finished product were examined. Results are shown in Table V. Liquid stock tends to dilute the product and decrease counts.

Flora in Eviscerated Poultry

It was possible to identify organisms in eviscerated poultry by their generic classification only. A total of 186 isolates, other than coliforms, were identified from the surface of freshly eviscerated poultry. Included were 30 cultures from chickens frozen six weeks and cultures from bone marrow of freshly killed and frozen chickens. Bone marrow cultures from 16 chickens, killed four hours previously, showed three micrococci.

Similar studies made with 32 chickens, frozen 7 to 125 days, gave six positive results. Micrococci were isolated from three, *Actinomyces* from two, and *Gaffkya*, *Achromobacter* and *Hemophilus* species from one each.

These results, which are summarized in table A, also show the following:

1. The abundance of coliform organisms on freshly eviscerated birds, their disappearance during cold storage and their reappearance in freshly boned chicken.
2. The prevalence of micrococci, *Achromobacter*, *Alcaligenes* and *Flavobacterium* species.

These genera are usually the predominant ones encountered in food plants.

Flora in Boned Chicken

All colonies were picked on 1:100,000 dilution plates from three samples of boned chicken. Three of the 46 isolates failed to grow on subcultures. The remaining isolates were micrococci, bacilli, sarcina and flavobacteria.

During these studies, 206 suspicious, colorless colonies were isolated. Only 13 were worthy of further study. None, however, was pathogenic. The 206 colonies were identified as: *Proteus*, 103; *Para-*

colobactrum, 48; coliform (*Aerobacter* and *Escherichia*), 21; *Alcaligenes*, 16; *Achromobacter*, 9; *Staphylococcus*, 5; *Flavobacterium*, 3, and *Pseudomonas*, 1.

Summary

1. Bacteria in cooked meat are reduced by precooking eviscerated poultry prior to boning.
2. Bacteria in boned chicken increase rapidly to excessive numbers during boning. Unsanitary conditions and the suitability of cooked meat for bacterial growth probably account for high increases.
3. Bacterial counts determined by direct smears on canned, processed poultry-containing products and plate counts on fresh-frozen products are indexes of unsanitary production methods.
4. Bacterial flora in eviscerated poultry-containing products are similar to those found in other fresh-frozen foods.

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—End—

Perpetual Inventory

(*Continued from page* 97)

original shipping order form is returned to the office where the information on that shipping order is posted to the office inventory cards.

Whenever the physical count is checked with the warehouse cards, the date of the count is recorded on the card. Consequently, it is possible to note at a glance whether or not a recheck is necessary, depending upon the date of the last shipment made from the stock.

When returns to stock are received, the original stock card, showing all the shipping information, is taken from the file. If goods are returned for credit reasons or for reasons other than grade, they are blocked into their original

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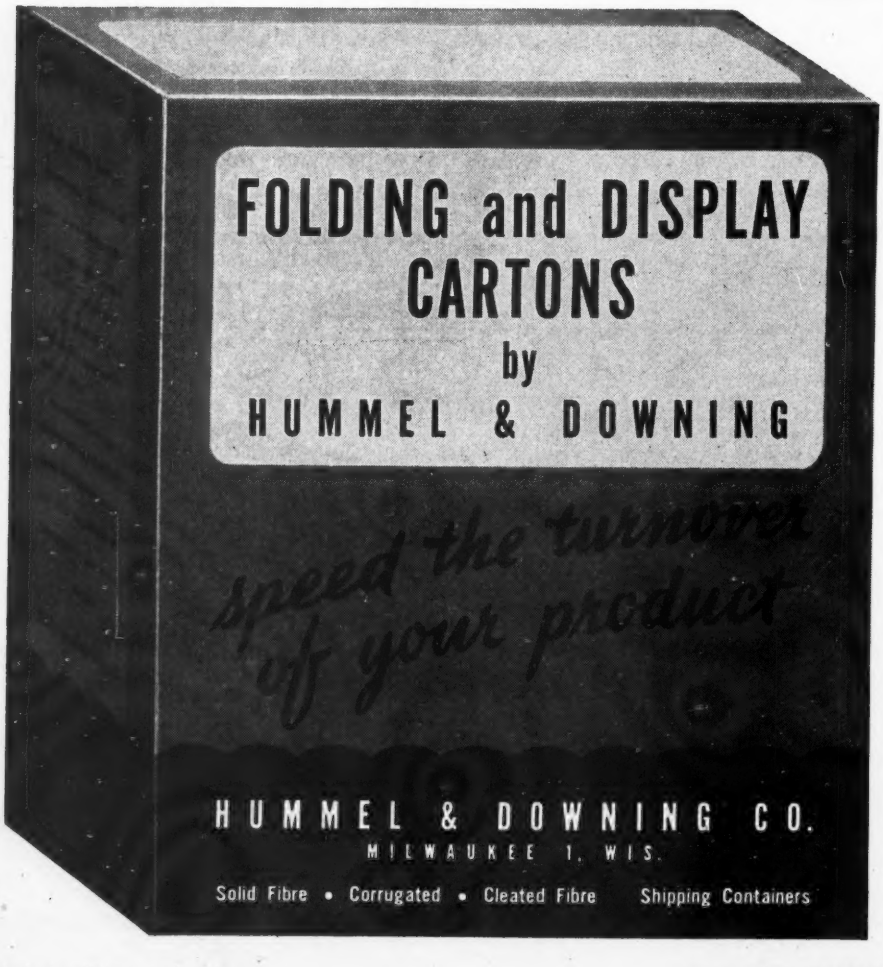


block. A duplicate shipping order, marked credit on pink paper, is issued by the office.

If goods are returned for grade, spoilage or condition reasons, the same pink shipping credit order is issued. Upon receipt of the goods, they are regraded by the factory superintendent or grader and then blocked in the warehouse as original packed goods are handled. No production record is made, however, and regrade details are noted on original inventory cards for record purposes.

The physical inventory system keeps the warehouseman busy during slack periods. File cards can be checked with the stock cards and the stock cards with actual count. In this way, samples, swells, pilferage and errors in count will be accounted for and records properly kept.

—End—

General Mills

(*Continued from page* 101)

control of original developments and designs within the organization, preventing information leaks to competing firms.

The convenience and efficiency of this plan have been shown time after time, recently in the development of our pea soup ingredients. Part of this product's appeal lies in the fact that it consists of finely divided vegetable particles, massed into larger shreds which break up during cooking and do not become lumpy or pasty. During early process studies, our staff did this extruding through an auger-type meat chopper. They found, however, that this device did not produce the best granularity.

The engineering staff then designed a rotary extruder, which solved the problem, and the mechanical division built the machine months before it could have been obtained from an outside firm.

This type of cooperation, I believe, exemplifies the complete research program which we, at General Mills, believe to be the food producer's best success insurance—cooperation which begins at the conception of an idea and literally never ends.

After formulation, process studies and consumer tests are all complete, the research department cooperates in final plant design and assists the manufacturing department in the transition from pilot plant to full commercial production.

Since manufacture of many new

grocery products requires entirely new technics, plant foremen as well as operators often must be indoctrinated in the processes—and obviously, the organization which developed the product is eminently qualified to do the indoctrinating. In almost every case—Cheerios, Betty Crocker soups, the new Apple Pyequick—our research department joins the products control and manufacturing departments in a careful watch on initial production; together these departments can normally eliminate most problems before they become acute.

However, a new grocery specialty is not a transitory thing. Its producer hopes it will become and remain a staple in American kitchens and on American tables. If he expects that hope to be fulfilled in this world of changing tastes and habits, the manufacturer must never lose the "research spirit." His market research organization must keep its finger on the public pulse, ready to detect the slightest change in consumer desire; his chemists and engineers must constantly seek ways of making a good product even better and ways of manufacturing that product at less cost, of better quality and in larger quantity.

This is our philosophy for success—a philosophy which has stood the test of many generations.

—End—

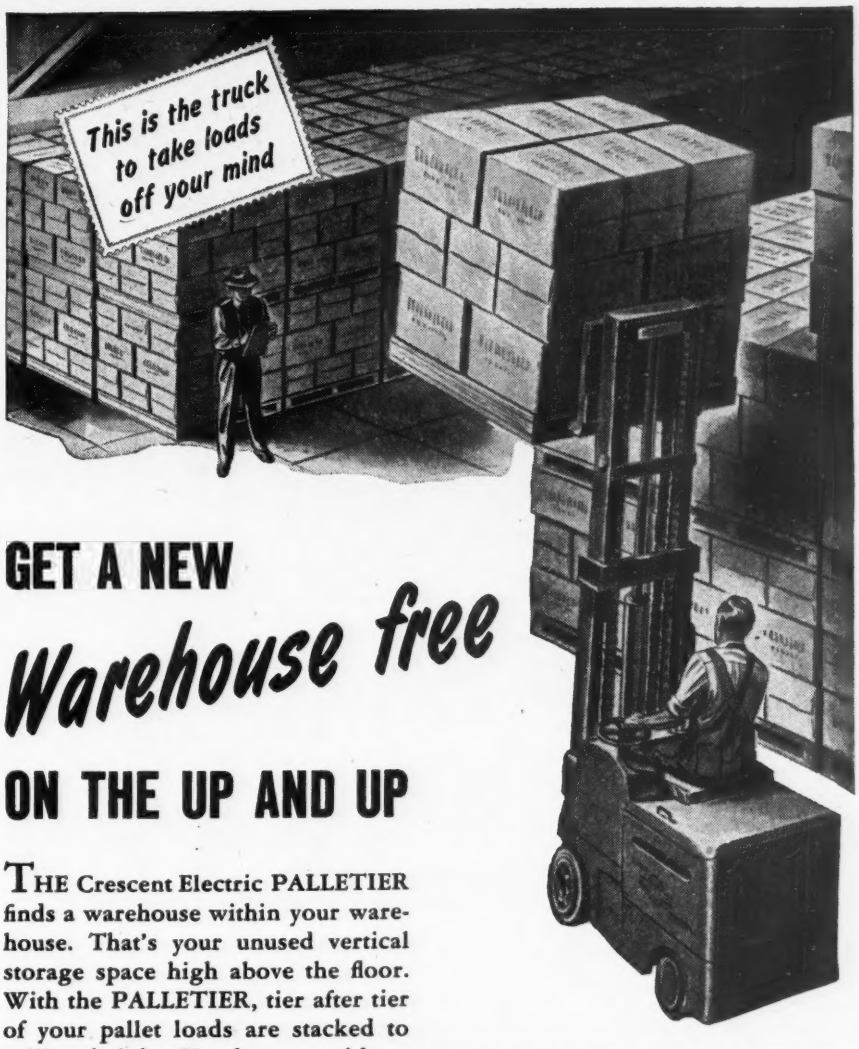
Fresh-Fruit Spreads

(*Continued from page* 83)

four months of freezing storage (–10 deg. F.), defrosting, and eight days of storage at 40 deg. F. Guava gelled fruit, containing 115 mg. of natural ascorbic acid per 100 g., has been prepared. The original puree with no added sugar contained 254 mg. per 100 grams.

When ascorbic acid was added as an antioxidant to fruit purees—for example Santa Rosa plum puree—which had active oxidative enzymes, there was considerable loss, as expected, during preparation of gels (mixing and setting time). No significant loss took place during freezing storage (–10 deg. F.). Ascorbic acid, added to plum puree which had been flash heated to inactivate the enzymes, was very well retained.

To reduce flavor changes which may take place at higher temperatures of storage after defrosting, it is preferable that storage time at room temperature be kept to a minimum. Although the cold-proc-



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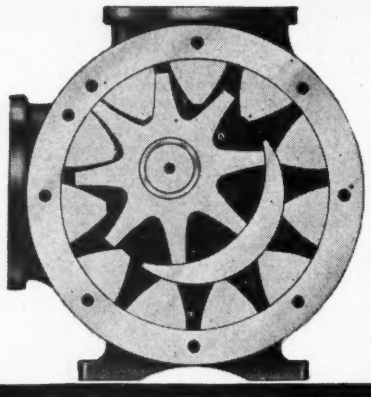

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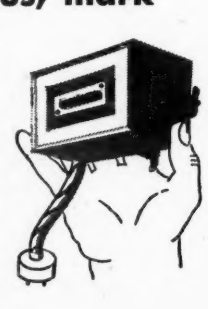

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essed fruit gels will ordinarily keep satisfactorily for several days at room temperature, when covered to avoid drying on the surface, it is advisable that the product be stored at 40 to 50 deg. F., as in an ordinary household refrigerator, between servings or other uses. The product can be refrozen and defrosted without any deleterious effect on texture.

Summary

Two new gelled fruit products, which retain to a high degree the fresh flavor and aroma and the natural color of the ripe fruit, are described. The remarkably high retention of fresh flavor is accomplished by preparing the product at room temperature and preserving it at a temperature of 0 deg. F., or lower. The new products are prepared with fresh or frozen fruit juice or puree, sugar, and pectin. They have a soluble solids content somewhat lower than that of jellies and jams.

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—End—

Wrapping Frozen Meat

(*Continued from page* 87)

percent relative humidity in an outside atmosphere of 100 deg. F. and 50 percent relative humidity. A vapor pressure differential of 52.4 lb. per sq. ft. under these conditions will be constantly trying to drive water-vapor through the cooler walls. Consequently, as the moisture-vapor passes through the insulation, it eventually reaches the dew point and condenses. It will, therefore, soak the insulation. Eventually the water-soaked walls will increase the cost necessary to operate the cooler and the refrigerating equipment may not be able to maintain proper temperatures in the cooler. This condition can be avoided by the use of a proper moisture-vapor barrier, as indicated in Fig. 1(b).

Freezing Unpackaged Meats

Let us examine the mechanics of moisture losses from meat and show how these losses can be prevented by the proper application of a good moisture-vapor barrier. Fig.

2(a) illustrates a piece of unwrapped meat at 50 deg. F., cut to proper size and being frozen in 0 deg. F. air. The temperature and moisture-vapor pressure of the meat are high and the temperature and moisture-vapor pressure of the surrounding air are low. Consequently, the vapor pressure created causes the moisture in the meat to migrate from the meat in the direction of the arrows shown. The internal moisture moves toward the external surfaces of the meat, passes through the meat surfaces and is then absorbed in the surrounding air. This process will continue until a temperature and vapor pressure equilibrium is established. Such an equilibrium will probably never occur. Meat handled this way will quickly be dehydrated.

Poor Wrapper Poorly Applied

Fig. 2(b) shows this same piece of meat wrapped in a poor material, poorly applied. While the wrapper offers some resistance to the passage of moisture-vapor to the surrounding air, it does not prevent moisture losses. Following the arrows representing moisture-vapor in the illustration, moisture-vapor passes from the interior of the meat to the meat surfaces, then through them to the air entrapped between the wrapper and the meat. Moisture will continue to pass through the wrapper and be lost from the meat as in the case of unwrapped meat. The rate of moisture loss, however, will be somewhat retarded.

Good Wrapper Poorly Applied

A similar piece of meat, wrapped with good material which has been poorly applied, is shown in Fig. 2(c). Again, following the arrows representing moisture-vapor, the vapor migrates to the meat surface, through the surface and into the air between the meat and the wrapper. In this case, however, the wrapper is a good moisture-vapor barrier. Moisture-vapor does not pass through the wrapper, but is turned back and deposited as frost on the surface of the meat. While moisture losses will be retarded by the good barrier material, some moisture is lost and the lean surfaces of the meat shows deterioration.

Good Wrapper Properly Applied

Fig. 2(d) illustrates the same piece of meat wrapped with a good moisture-vapor barrier material, properly applied. The wrapper is in contact with the surface of the meat, without air pockets between

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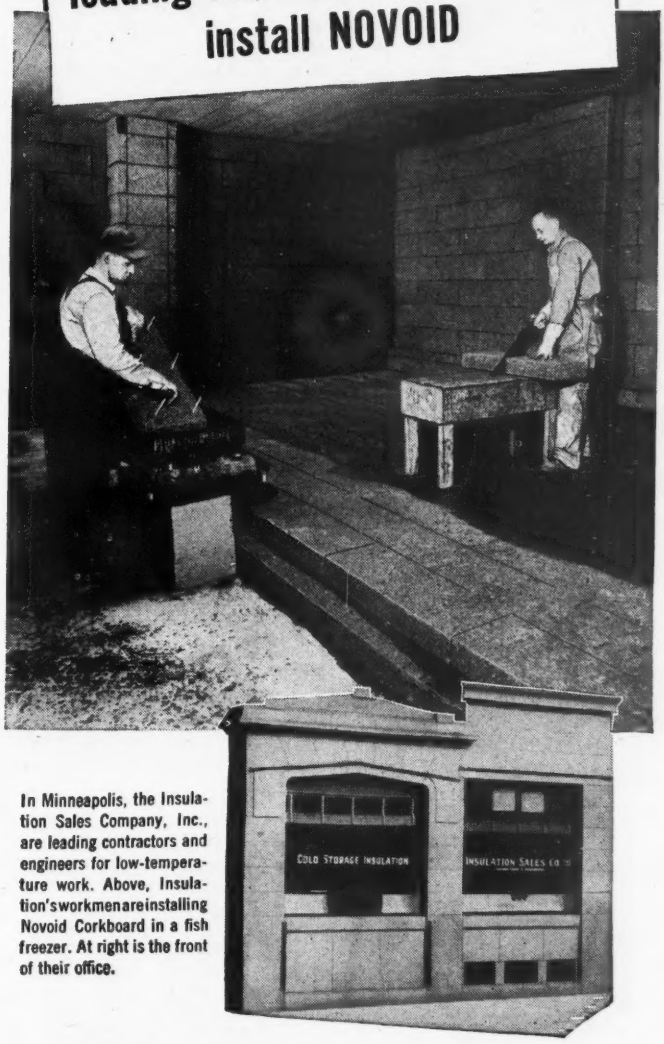

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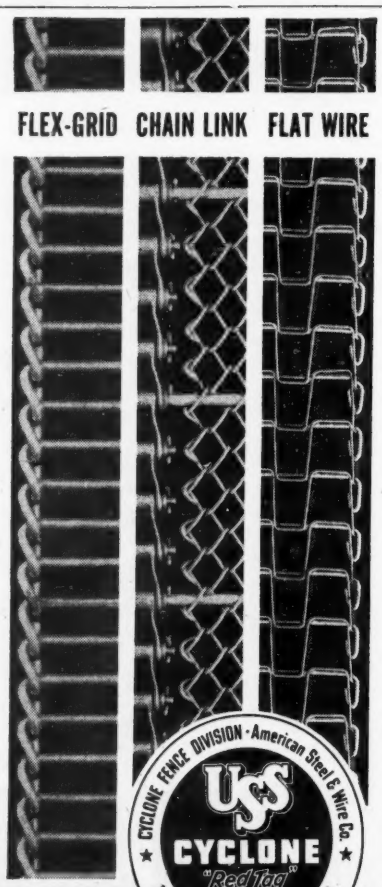


UNITED STATES STEEL

the wrapper and the meat. The arrows in the illustration show some migration of moisture-vapor to the surface of the meat. Since the wrapper is a good barrier and it is tightly applied, moisture-vapor can not penetrate through the surface. Consequently, it is retained by the meat and the meat shows no evidence of dehydration.

—End—

Wheat

(*Continued from page* 71)

($112) per ton f.o.b. Rather than eke out insufficient supplies of rice with wheat, which Australia sells at $99 a ton, Indians are said to prefer Rycena.

Ponderous international procedures under the present food emergency and customers imposts on processed grains have limited Rycena shipments to some markets, the biggest of which is Ceylon. The Rycena people are confident that the end of the food crisis in the East does not spell the end of Rycena. On the contrary, restoration of normal trader-to-trader transactions is expected to give Rycena its real break. Offices have been opened in all parts of East Asia except Japan. The long-range economic theory behind Rycena is that Australian wheat has been going begging most of the time for lack of market, often at times when rice is in critical supply in the "Near North" and selling at prices much higher than wheat.

—End—

Pasteurizing With U. V.

(*Continued from page* 85)

All parts of the equipment that come in contact with the milk will have to be of stainless steel or equal. The end plates and panels can be of cast aluminum as the milk never comes in contact with either of these parts. I am giving considerable thought to the use of plastics for the smaller models. The use of plastic parts will help to reduce the cost.

As a matter of fact, the cylinders and all other parts can be of plastic for a similar unit for sterilizing water in bottling plants. Cylinders of plastic would provide a better surface to keep the water evenly spread, as water tends to channel on stainless and aluminum.

An interesting fact that many laboratory runs have brought out is the flavor of the milk. At the

Thornton Laboratory in Tampa, samples of raw, batch pasteurized and U. V. pasteurized milk were set out for the entire staff to taste. The U. V. treated milk was always selected as the best tasting, and everyone said it was sweeter. I do not think that is due to any conversion, but rather to the elimination of bacteria that develop stable odors and flavors, leaving the milk sweet, as it should be.

Units designed for creamery use will be doubled up—that is, one lamp will take care of four cylinders instead of two. The lamps will be attached to sliding racks that will slide between each bank of cylinders, and slide out for cleaning.

Milk, as it is received from the farmer, will be pumped to storage tanks sufficiently elevated to feed the sterilizer by gravity. The sterilizer in turn would be high enough for the milk to flow directly into the bottle filler.

This method will place the milk in the bottles as it is pasteurized without a holdover for cooling and without pumping. In this way there will be no place where airborne bacteria can get to the milk after pasteurization except accidentally from the bottle caps.

—End—

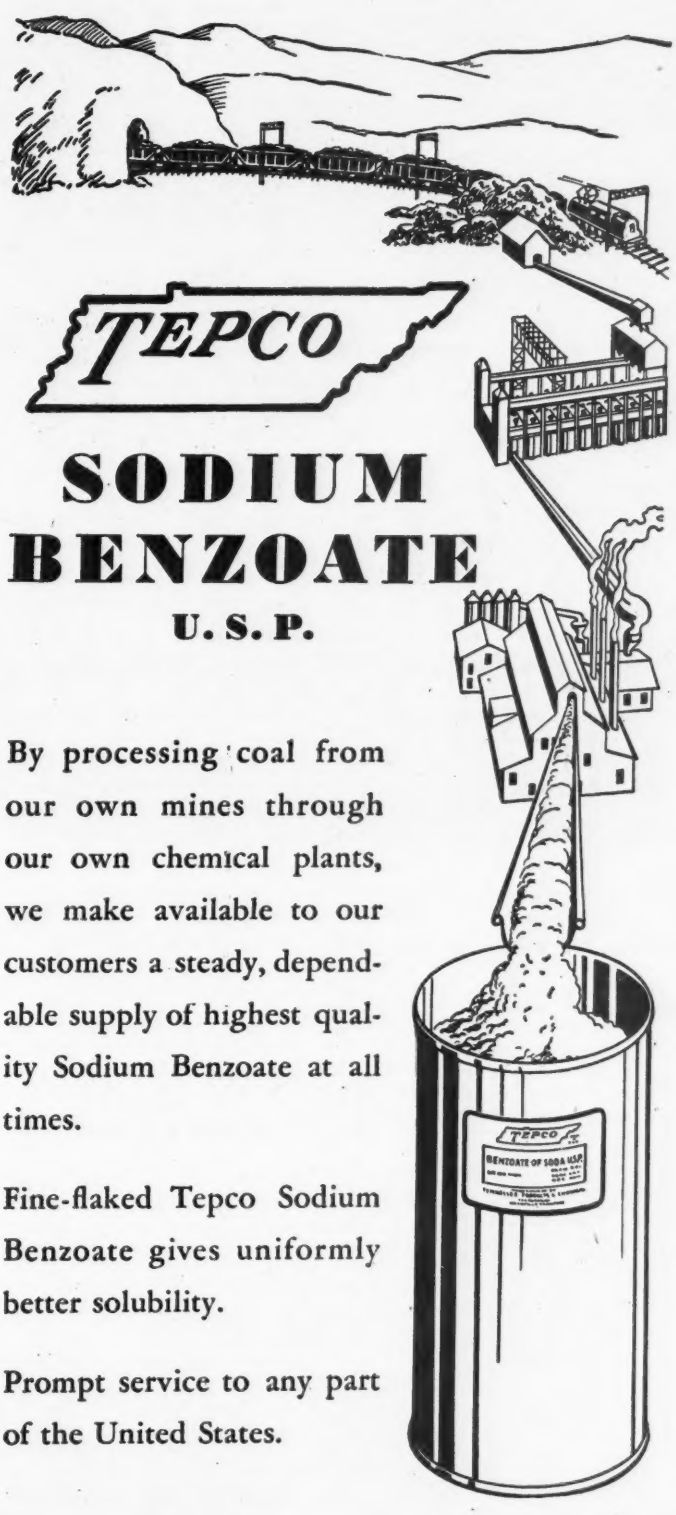
Moxie Plant

(*Continued from page* 110)

cool for satisfactory charging of water in the carbonator. The carbonator has a capacity of 1,500 gal. per hr.

After the bottles are filled they are automatically crowned. They are then conveyed to the mixing machine, where they are quickly turned upside down and reversed in a rotatory path to accomplish a permanent mixture of the Moxie ingredients. Automatic transfer to a conveyor follows, thence to a Triplex labeling machine. From here the conveyor system carries the bottles to a Standard-Knapp case loading machine. At this point an attendant receives the clean empty cases on a conveyor at one side, and places an empty box on a base below the arriving line of filled and labeled, capped bottles. The machine picks up 24 7-oz. bottles from conveyor and, on release by operator's pedal, drops them about 10 in. into place in the case.

The operator then pushes each full case upon a conveyor which carries it past two International registers. These are in duplicate for checking purposes and record



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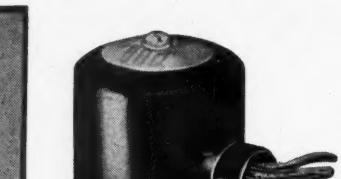

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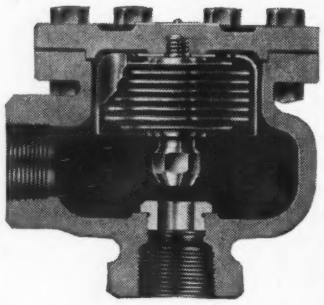

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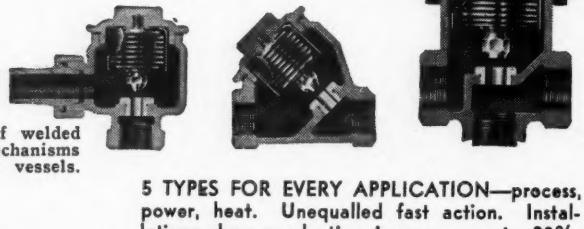

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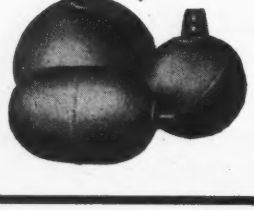

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the number of cases delivered to the shipping department, the conveyor beyond the registers being of the gravity type.

The entire department is laid out to facilitate washing down equipment and maintaining clean floors. While little broken glass occurs, the washer unit is provided with manholes to facilitate its removal with debris or dirt which is washed off and from the bottles in process of being cleaned. This is easily cared for by hose and hoe at bottom of washer, and sludge is normally carried to the sewer by a 6-in. drain.

—End—

Sugar in Bulk

(*Continued from page 77*)

cloth cylinders was installed for the hoppers above each kettle area. This is at once a safety and an economy measure, for the potentially explosive dust is accumulated for use in production.

High purity air is provided in this installation by filtering through a series of fibrous baffles; this reduces contamination to one-tenth that of ordinary air. Combined with the total absence of the lint and dust which accompany sacked sugar, this system has given definite improvement in sanitation control.

Tea Garden has also found that the "trip scale," which automatically weighs exact amounts of sugar into process, cuts costs and increases output.

Other general in-plant advantages found to accrue from the use of bulk granulated sugar are the elimination of unloading, piling, warehousing and bag-salvage costs; reduction of storage space, and prevention of sugar losses resulting from sifting and clinging of grains to sacks. The gain in efficiency and economy of operation using bulk dry sugar is generally considered to offset equipment installation costs in less than three years.

Bulk dry sugar bins may be made of metal, cement or wood. Some protection should be provided against temperature and humidity changes. If sugar is stored for more than one week, arrangements should be made for circulation or agitation to prevent caking. For truck-size deliveries, cone-bottom cylindrical metal tanks, lightly insulated, are best; for carload deliveries, a wooden bin with multiple discharge hoppers has been found most satisfactory. Insulation or

air-conditioning can be provided in the space between the smooth bin lining and the shell. To receive 1,000-bag deliveries, a bin should be at least 10 ft. in diameter and 30 ft. high.

Conveying equipment for bulk dry sugar may be either pneumatic or mechanical, or a combination of both. Each system has its own advantages. Chutes, screw, and bucket elevators are favored by some manufacturers because they preserve the sugar grains intact and, while initially expensive, require very little power. Drag conveyors can negotiate turns, but do have some effect on size and luster of grains. A pneumatic system is frequently highly satisfactory, but may prove more expensive to maintain and operate, and excessive friction may create a higher percentage of sugar dust.

Automatic weighing-to-process equipment is necessary both for formula measurement of bulk sugar and for cost accounting. Batch weighers are usually used which automatically measure a specified weight into process.

A stand-by arrangement for dumping bagged sugar into the conveying system should be provided.

Before making any bulk sugar handling installation, liquid or dry, the manufacturer should seek the advice of sugar specialists, competent engineers, and equipment supply companies.

—End—

Low Overrun

(*Continued from page* 79)

conclusions. Marked score cards were dropped into a ballot box and tabulated before the final meeting.

With butterfat at its present high price, the results of this demonstration are particularly timely. Cost of the 10 percent butterfat ice cream, with 61 percent overrun, was 82 cents per gallon, compared to $1.00 for the 16 percent butterfat-89 percent overrun ice cream.

This is an extreme demonstration and should not be taken as an indication that a 10 percent butterfat ice cream is acceptable in most markets today. It does, however, raise this point—will not a 12 or 14 percent butterfat ice cream, with 60 to 65 percent overrun, meet with greater consumer acceptance than a 16 percent butterfat product with 90 percent overrun? And it should save money for the manufacturer.

YOU'RE ALWAYS SURE With A LIQUIDOMETER Tank Gauge

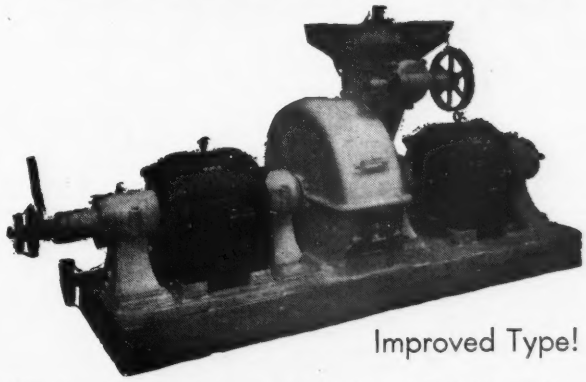
WRITE for COMPLETE DETAILS.

"LIQUIDS WORTH STORING ARE WORTH MEASURING"

THE LIQUIDOMETER CORP.
38-14 SKILLMAN AVE., LONG ISLAND CITY, N.Y.

ROBINSON
PROCESSING UNIQUE EQUIPMENT

ATTRITION MILLS



Improved Type!

Attrition Mills for grinding all types of material. Adjustable for coarse or fine grinds. Hard iron grinding plates. Capacities to your requirements. Robinson Processing Equipment is designed by engineers whose reputation is founded upon doing things right. Literature available. Inquiries invited.

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Plant: Muncy, Pa.
SALES REPRESENTATIVE
MERCER-ROBINSON COMPANY, INC.
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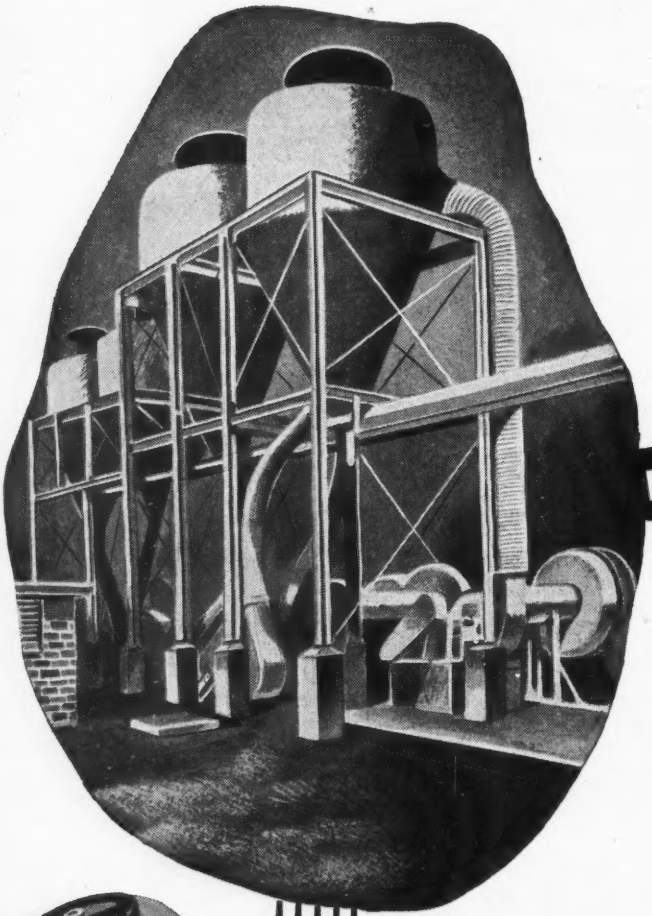
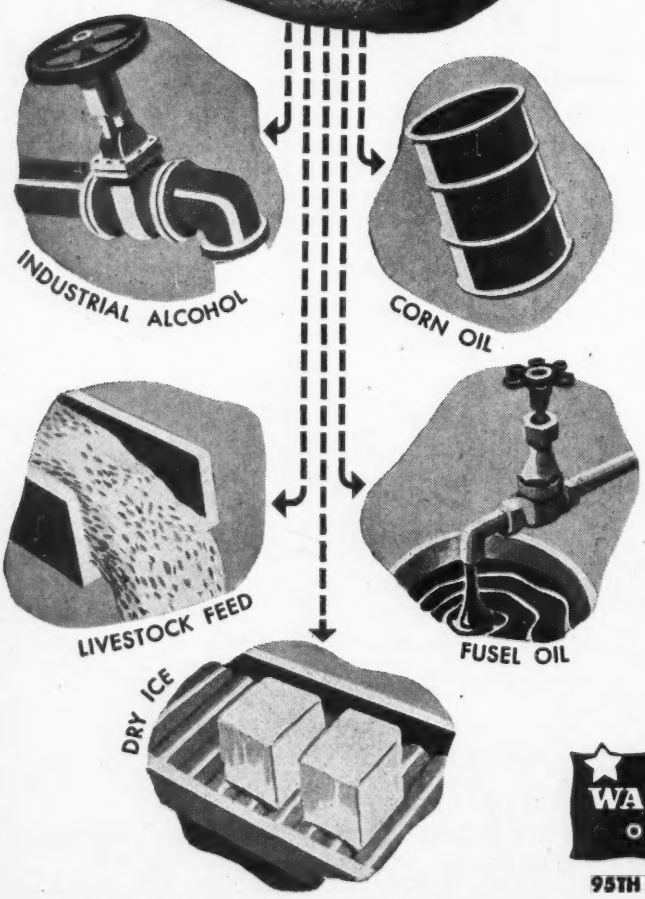
INDUSTRIAL ALCOHOL PLANT OMAHA, NEBRASKA

Approximate annual capacity of this plant: 17,500,000 gallons 190-proof Ethyl alcohol, 63,000 tons stock feeds, 25,000,000 pounds mold bran, 4,900,000 pounds corn oil, 35,000 tons dry ice, 175,000 gallons fusel oil.





This fully-equipped, ready-to-go plant also suitable or readily adaptable to . . .

- ★ Corn sugar and syrup manufacture
- ★ Food processing
- ★ Agricultural feeds production

FOR SALE OR LEASE NOW

Here is an industrial grain alcohol plant with complete facilities for the following operations: (a) grain handling, including cleaning, storing and milling; (b) fermentation, including fermentation tanks and coolers with pumps, agitators and other accessories; (c) yeast processing, including tanks and coolers; (d) stilling and rectifying, including stills, condensers, rectifying columns; (e) evaporators and various equipment for solidifying recovered feeds and syrups.

LOCATION: This modern processing plant, located on 6.28 acres of land at Omaha, Nebraska, is on the west bank of the Missouri River. Omaha is in the heart of one of the nation's largest grain producing areas.

BUILDINGS: Five—of steel frame and brick construction are included in this offer. Other structures include grain elevators, storage tanks and gatehouses.

TRANSPORTATION: The plant is served by the C. B. & Q. and the Union Pacific Railroads. City-paved streets connect with arterial highways. Water transportation is available on the Missouri River.

BASIS OF OFFERING: (1) You can buy or lease land, buildings, machinery and equipment as an industrial alcohol unit.

(2) You can buy or lease land and buildings, less machinery and equipment, for other industrial uses.

(3) You can buy machinery and equipment for removal and use off-site.

SEALED BIDS: Your proposals will be accepted on Standard Bid Forms until 2:00 P.M., C.S.T., December 17, 1947, at War Assets Administration, Office of Real Property Disposal, 95th & Troost Avenue, Kansas City, Missouri.

WRITE NOW: Brochures, engineering reports and other information are available on this property.

All requests for brochures and bid forms should be addressed:

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